

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 63

[FRL-7236-6]

RIN 2060-AE85

**National Emission Standards for Hazardous Air Pollutants:
Mercury Emissions from Mercury Cell Chlor-Alkali Plants**

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: This action proposes national emission standards for hazardous air pollutants (NESHAP) for mercury cell chlor-alkali plants. The proposed standards would limit mercury air emissions from these plants. The proposed standards would implement section 112(d) of the Clean Air Act (CAA) which requires all categories and subcategories of major sources and area sources listed in section 112(c) to meet hazardous air pollutant emission standards reflecting the application of the maximum achievable control technology (MACT). The proposed standards would reduce nationwide mercury emissions from these sources by about 4,100 kilograms per year (kg/yr) (9,100 pounds per year (lb/yr)) from the levels allowed by the existing mercury NESHAP.

Mercury is a neurotoxin that accumulates, primarily in the especially potent form of methylmercury, in

aquatic food chains. The highest levels are reached in predator fish species. Mercury emitted to the air from various types of sources (usually in the elemental or inorganic forms) transports through the atmosphere and eventually deposits onto land or water bodies. When mercury is deposited to surface waters, natural processes (bacterial) can transform some of the mercury into methylmercury that accumulates in fish. The health effect of greatest concern due to methylmercury is neurotoxicity, particularly with respect to fetuses and young children.

DATES: Comments. Submit comments on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER].

Public Hearing. If anyone contacts the EPA requesting to speak at a public hearing by [INSERT DATE 20 DAYS AFTER DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER], a public hearing will be held on [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER].

ADDRESSES: Docket. Docket No. A-2000-32 contains supporting information used in developing the proposed standards for the mercury cell chlor-alkali plant source category. The docket is located at the U.S. EPA, 401 M

Street, SW, Washington, DC 20460 in Room M-1500, Waterside Mall (ground floor), and may be inspected from 8:30 a.m. to 5:30 p.m., Monday through Friday, excluding legal holidays.

FOR FURTHER INFORMATION CONTACT: Mr. Iliam Rosario, Metals Group, Emission Standards Division (C439-02), U.S. EPA, Research Triangle Park, North Carolina 27711, telephone number: (919) 541-5308, facsimile:(919) 541-5600, electronic mail address: rosario.iliam@epa.gov.

SUPPLEMENTARY INFORMATION:

Comments. Comments and data may be submitted by electronic mail (e-mail) to: a-and-r-docket@epa.gov. Electronic comments must be submitted as an ASCII file to avoid the use of special characters and encryption problems and will also be accepted on disks in WordPerfect® format. All comments and data submitted in electronic form must note the docket number: Docket No. A-2000-32. No confidential business information (CBI) should be submitted by e-mail. Electronic comments may be filed online at many Federal Depository Libraries.

Commenters wishing to submit proprietary information for consideration must clearly distinguish such information from other comments and clearly label it as

CBI. Send submissions containing such proprietary information directly to the following address, and not to the public docket, to ensure that proprietary information is not inadvertently placed in the docket: OAQPS Document Control Office (C404-02) Attention: Iliam Rosario, Metals Group, Emission Standards Division, U.S. EPA, Research Triangle Park, NC 27711. The EPA will disclose information identified as CBI only to the extent allowed by the procedures set forth in 40 CFR part 2. If no claim of confidentiality accompanies a submission when it is received by the EPA, the information may be made available to the public without further notice to the commenter.

Public Hearing. Persons interested in presenting oral testimony or inquiring as to whether a hearing is to be held should contact Cassie Posey, telephone number: (919) 541-0069. Persons interested in attending the public hearing must also call Cassie Posey to verify the time, date, and location of the hearing. The public hearing will provide interested parties the opportunity to present data, views, or arguments concerning the proposed emission standards.

Docket. The docket is an organized and complete file of all the information considered by the EPA in rule

development. The docket is a dynamic file because material is added throughout the rulemaking process. The docketing system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can effectively participate in the rulemaking process. Along with the proposed and promulgated standards and their preambles, the contents of the docket will serve as the record in the case of judicial review. (See section 307(d)(7)(A) of the CAA.) The regulatory text and other materials related to this rulemaking are available for review in the docket or copies may be mailed on request from the Air Docket by calling (202) 260-7548. A reasonable fee may be charged for copying docket materials.

World Wide Web Information. In addition to being available in the docket, an electronic copy of today's proposed rule will also be available through EPA's World Wide Web site. Following signature, a copy of the rule will be posted on our policy and guidance page for newly proposed or promulgated rules:

<http://www.epa.gov/ttn/oarpg>. The web site provides information and technology exchange in various areas of air pollution control. If more information regarding the

web site is needed, call our web site help line at (919) 541-5384 Regulated entities. Entities potentially affected by this action include plants engaged in the production of chlorine and caustic in mercury cells. Regulated categories and entities include those sources listed in the primary Standard Industrial Classification code 2812 or North American Information Classification System code 325181.

This description is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. To determine whether your facility, company, business, organization, etc., is regulated by this action, you should carefully examine §63.8182 of the proposed rule. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding FOR FURTHER INFORMATION CONTACT section. Outline. The information presented in this preamble is organized as follows:

I. Background

- A. What is the source of authority for development of NESHAP?
- B. What criteria are used in the development of NESHAP?
- C. What is a mercury cell chlor-alkali plant?
- D. What are the health effects associated with mercury?
- E. How does this action relate to the part 61 Mercury NESHAP?

II. Summary of Proposed Standards

- A. What is the source category?
- B. What are the affected sources and emission points to be regulated?
- C. What are the emission limitations?
- D. What are the work practice standards?
- E. What are the operation and maintenance requirements?
- F. How are initial and continuous compliance with the emission limitations to be demonstrated?
- G. How are initial and continuous compliance with the work practice standards to be demonstrated?
- H. What are the notification and reporting requirements?
- I. What are the recordkeeping requirements?
- III. Rationale for Selecting the Proposed Standards
 - A. How did we select the source category?
 - B. How did we select the affected sources and emission points to be regulated?
 - C. How did we select the form of the standards?
 - D. How did we determine the basis and level of the proposed standards for existing sources?
 - E. How did we determine the basis and level of the proposed standards for new sources?
 - F. How did we select the testing and initial compliance requirements?
 - G. How did we select the continuous compliance requirements?
 - H. How did we select the notification, recordkeeping, and reporting requirements?
- IV. Summary of Environmental, Energy, Cost, and Economic Impacts
 - A. What are the air emission impacts?
 - B. What are the non-air health, environmental, and energy impacts?
 - C. What are the cost and economic impacts?
- V. Solicitation of Comments and Public Participation
- VI. Administrative Requirements
 - A. Executive Order 12866, Regulatory Planning and Review
 - B. Executive Order 13132, Federalism
 - C. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments
 - D. Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks
 - E. Unfunded Mandates Reform Act of 1995
 - F. Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA)
 - G. Paperwork Reduction Act
 - H. National Technology Transfer and Advancement Act

I. Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use

I. Background

A. What is the source of authority for development of NESHAP?

Section 112 of the CAA contains our authorities for reducing emissions of hazardous air pollutants (HAP). Section 112(d) requires us to promulgate regulations establishing emission standards for each category or subcategory of major sources and area sources of HAP listed pursuant to section 112(c). Section 112(d)(2) specifies that emission standards promulgated under the section shall require the maximum degree of reductions in emissions of the HAP subject to section 112 that are deemed achievable considering cost and any non-air quality health and environmental impacts and energy requirements.

Each national emission standard for hazardous air pollutants (NESHAP) established reflects the maximum degree of reduction in emissions of HAP that is achievable. This level of control is commonly referred to as maximum achievable control technology (MACT).

Section 112(c)(6) requires us to list source categories and subcategories assuring that sources

accounting for not less than 90 percent of the aggregate emissions of each of seven specific pollutants (including mercury) are subject to standards under section 112(d) of the CAA.

Mercury cell chlor-alkali plants are among the sources listed to achieve the 90 percent goal for mercury.

B. What criteria are used in the development of NESHAP?

Section 112(d)(2) specifies that NESHAP for new and existing sources must reflect the maximum degree of reduction in HAP emissions that is achievable, taking into consideration the cost of achieving the emissions reductions, any non-air quality health and environmental benefits, and energy requirements. This level of control is commonly referred to as MACT.

Section 112(d)(3) defines the minimum level of control or floor allowed for NESHAP. In essence, the MACT floor ensures that the standard is set at a level that assures that all affected sources achieve the level of control at least as stringent as that already achieved by the better-controlled and lower-emitting sources in each source category or subcategory. For new sources, the MACT floor cannot be less stringent than the emission control that is achieved in practice by the best-

controlled similar source. The MACT standards for existing sources cannot be less stringent than the average emission limitation achieved by the best-performing 12 percent of existing sources in the category or subcategory (or the best-performing five sources for categories or subcategories with fewer than 30 sources).

In developing MACT, we also consider control options that are more stringent than the floor. We may establish standards more stringent than the floor based on the consideration of cost of achieving the emissions reductions, any non-air quality health and environmental impacts, and energy impacts.

C. What is a mercury cell chlor-alkali plant?

1. Mercury Cell Chlor-Alkali Production Facilities

At a mercury cell chlor-alkali plant, mercury cell chlor-alkali production facilities are used to manufacture chlorine and caustic as co-products and hydrogen as a by-product through the electrolytic decomposition of brine in mercury cells. The central unit is the mercury cell which is a device comprised of an electrolyzer (electrolytic cell) and decomposer with one or more end boxes and other components linking them. While each mercury cell is an independent production unit, numerous cells are connected electrically in series

to form a cell circuit. Cells are situated in a cell room and typically arranged in two rows separated by a center aisle. The cell room is generally a two-story structure in which mercury cells are housed on the upper floor. The lower floor houses various process and housekeeping functions. The number of mercury cells at a given plant ranges from 24 to 116 and averages 56. A mercury cell involves two distinct reactions which occur in separate vessels. The electrolyzer produces chlorine gas, and the decomposer produces hydrogen gas and caustic solution (sodium hydroxide or potassium hydroxide). The electrolyzer can be described as an elongated, shallow steel trough enclosed by side panels and a top cover. A typical electrolyzer measures about 15 meters (about 50 feet) in length and 1.5 meters (about 5 feet) in width and holds about 3,600 kilograms (around 8,000 pounds) of mercury. The decomposer is a 4-to-5 feet high cylindrical vessel located at the outlet end of the electrolyzer and is usually oriented vertically. The electrolyzer and the decomposer are typically linked by an inlet end box and an outlet end box.

A shallow stream of liquid mercury flows continuously between the electrolyzer and the decomposer. The mercury enters the cell at the inlet end box and

flows down a slight grade to the outlet end box, where it flows out of the cell into the decomposer. After being processed in the decomposer, the mercury is pumped back to the inlet end box of the cell.

Saturated brine (sodium chloride solution or potassium chloride solution) is fed to the electrolytic cell via the inlet end box and flows toward the outlet end box above the shallow layer of mercury. Both brine and mercury flow beneath dimensionally stable metal anodes, typically made of a titanium substrate with a metal catalyst that are suspended in the electrolyzer top. The flowing mercury serves as the cathode.

Electric current applied between the anodes and the mercury cathode causes a reaction that produces chlorine at the anode, while an alkali metal (sodium or potassium) binds with the mercury as an amalgam at the cathode. The chlorine gas is collected at the top of the cell and transported to an ancillary gas purification system followed in most cases by a liquefaction facility. The alkali metal/mercury amalgam exits via the outlet end box and enters the decomposer. The brine, whose salt content has been partially depleted in the reaction, also exits the cell via the outlet end box and is transferred to an ancillary brine preparation system.

The decomposer functions as a packed bed reactor in which the alkali metal/mercury amalgam contacts deionized water in the presence of a catalyst. The amalgam reacts with the water, liberating the mercury and yielding caustic soda (sodium hydroxide) or caustic potash (potassium hydroxide) and hydrogen. The caustic and mercury are separated in a trap at the end of the decomposer. The caustic and hydrogen are each transferred to ancillary treatment, and the mercury is pumped back to the inlet end of the cell.

As previously noted, end boxes serve as connections between the electrolyzer and decomposer in a mercury cell. The inlet end box collects and combines raw materials at the inlet end of the cell, and the outlet end box separates and directs various materials out of the cell. An end-box ventilation system, which is present at most but not all plants, evacuates the vapor spaces of the end boxes. The end-box ventilation system also commonly evacuates the vapor space of other vessels and process equipment, such as pump seals, wash water tanks, and caustic tanks and headers. In most cases, mercury contained in this equipment is covered with a layer of water or other aqueous liquid so the air being pulled into the end-box ventilation system is not in

direct contact with mercury. However, due to the elevated temperatures in this equipment, particularly end boxes, mercury diffuses through the liquid and is present in the vapor spaces. The concentration of mercury in end-box ventilation systems before any steps are taken to remove mercury varies greatly depending on the vacated equipment. The collected gases are usually cooled and then treated in a mist eliminator and other control equipment prior to being discharged to the atmosphere. It is the mercury remaining in the treated stream that causes the end-box ventilation system vent to be a point source of mercury air emissions for plants that have these systems.

Important ancillary operations at a mercury cell chlor-alkali plant include chlorine purification and liquefaction, brine preparation, caustic purification, by-product hydrogen cleaning, and wastewater treatment.

Chlorine gas is collected under vacuum from each mercury cell and fed into a header system leading out of the cell room. The chlorine then undergoes cooling, mist elimination, and drying. Only trace amounts of mercury remain in the product chlorine gas, typically less than 0.03 parts per million (ppm). Thus, limited mercury emissions are associated with the chlorine purification

operation, as this level is achieved without any steps for mercury removal and is consistent with final mercury concentrations for well-controlled gaseous by-product hydrogen streams. In most instances, further cooling, compression, and liquefaction are conducted to obtain liquid chlorine.

Brine flows in a continuous loop through the mercury cells and the brine preparation system which provides clean saturated brine for electrolysis. An important function of the brine system is the removal of impurities naturally associated with salt such as calcium, iron, and aluminum. The presence of these elements can adversely affect cell efficiency. These impurities are removed by the addition of caustic and sodium carbonate which react to form metal precipitates that are removed by filtration. Subsequently, the brine is acidified to remove excess caustic, subjected to heat exchange for temperature adjustment, and returned to the mercury cells as clean saturated brine. Mercury exists in the brine system in the form of dissolved mercuric chloride and on the order of 3 to 25 ppm. The low vapor pressure of mercuric chloride, which is approximately 30 times lower than that of elemental mercury at 35°C, limits the potential for emissions of mercury from the brine system.

Because the caustic solution produced directly from the decomposer is commercial grade, the only additional treatment needed is mercury removal. The concentration of mercury in the caustic stream leaving the decomposer ranges from about 3 to 15 ppm. Mercury is removed by cooling and filtration. Residual mercury contained in the caustic product is typically around 0.06 ppm.

Hydrogen gas exiting a decomposer contains mercury vapor. A mercury-saturated hydrogen gas stream typically leaves a decomposer at a temperature over 200°F. The mercury concentration of this stream can be as high as 3,500 milligrams per cubic meter (mg/m³). Accordingly, in most situations, each decomposer is equipped with an adjacent cooler through which the hydrogen gas stream is routed to condense mercury and return it to the mercury cell. After initial cooling, the hydrogen gas from each decomposer is collected into a common header. The combined gas is then treated for mercury with additional cooling and adsorption (or absorption) control equipment. The cleaned hydrogen gas is then either burned as fuel in a boiler, transferred to another process as a raw material, or vented directly to the atmosphere. Due to the mercury remaining in the treated stream, the by-

product hydrogen stream is a point source of mercury air emissions.

Mercury cell chlor-alkali plants generate a variety of aqueous waste streams that contain mercury and are treated in a wastewater treatment system. These wastewaters originate from a variety of sources, ranging from wastewaters produced from cell room washdowns and cleanup activities to liquids or slurries produced from purged brine from the brine system and backwash water from the filtration equipment used for caustic purification.

Wastewater treatment applied at most mercury cell chlor-alkali plants entails three basic steps. First, sodium hydrosulfide is added to the wastewater (which contains both elemental mercury and mercury compounded as mercuric chloride) to form mercuric sulfide. This compound has a very low vapor pressure which practically eliminates the potential for mercury air emissions from wastewater treatment. Next, the mercuric sulfide is removed through precipitation and filtration which results in a liquid fraction and a mercuric sulfide filter cake. Any dissolved mercury contained in the liquid is removed by treatment in a carbon adsorber prior to being discharged in accordance with a plant's

discharge permit. The wastewater treatment sludges produced, which consist mainly of the mercuric sulfide filter cake, are classified as hazardous under Resource Conservation and Recovery Act (RCRA) regulations (40 CFR part 261, subpart D). This waste, designated as K106, must be treated for mercury removal prior to disposal or landfilling which generally means high temperature treatment.

2. Mercury Recovery Facilities

Nine mercury cell chlor-alkali plants have mercury recovery facilities on-site to recover elemental mercury from mercury-containing wastes. The wastes treated include those considered K106 wastes, as cited above, and debris and nondebris D009 wastes. The D009 wastes, as classified under RCRA regulations (40 CFR part 261, subpart D), are nonspecific mercury-containing wastes. Debris wastes include any contaminated material or item greater than 2½ inches in any one dimension, such as hardware, protective gear, piping, and equipment. Nondebris wastes include graphite from decomposers, cell room sump sludges, spent carbon media from carbon adsorption control devices, and other small solids.

The most commonly used process is thermal recovery (retorting), where mercury-containing wastes are heated

to volatilize the mercury which is then condensed and recovered. Six plants each operate a mercury thermal recovery unit. In such a unit, mercury in wastes is driven to the vapor phase at temperatures over 1,000°F inside one or more retorts. The retort off-gas, which is rich in mercury vapor, is routed through cooling equipment to condense the mercury for recovery. However, because it is not possible to condense all of the mercury, the off-gas is typically routed through polishing control equipment to further reduce mercury before the stream is discharged to the atmosphere. This causes the mercury thermal recovery unit vent to be a point source of mercury air emissions. Mercury that never vaporizes and subsequently is neither condensed nor emitted remains in the retort ash, whose mercury content is limited by RCRA land disposal restrictions (40 CFR part 268, subpart E).

Mercury thermal recovery units can be classified, based on the type of retort used, as oven type units and non-oven type units. Three plants have batch oven retorts, and three plants have non-oven retorts (rotary kiln or single hearth). There are differences between the two types related to operating temperature and residence time. Oven retorts have lower operating

temperatures (around 1,000°F) and substantially longer residence times (24 to 54 hours) than do kilns which operate at around 1,375°F with residence times approaching 3 hours.

Noteworthy among all six thermal recovery units is the relatively small volume of exhaust gas generated. Volumetric flow rates range from around 50 standard cubic feet per minute (scfm) on one oven type unit to 1,200 scfm on one non-oven type unit. Non-oven type units have higher volumetric flow rates with an average flow rate of 1,000 scfm and a median of 1,075 scfm than oven type units with an average of 130 scfm and a median of 100 scfm.

Two of the nine plants use a chemical process in which mercuric sulfide and elemental mercury in wastes are chemically transformed to mercuric chloride from which elemental mercury is then precipitated. This process differs from mercury thermal recovery in that it is an entirely liquid-phase operation. Moreover, owing to the low vapor pressure of mercuric chloride, the potential for mercury air emissions from this process is limited. Mercury that is not converted and recovered remains in the processed waste materials whose mercury content is limited by RCRA land disposal restrictions for

nonthermal mercury recovery processes (40 CFR part 268, subpart E).

The ninth plant uses a batch purification still for recovering elemental mercury only from end-box residues which are high in mercury content. The system involves heating small batches of end-box residues to volatilize the mercury contained followed by a condenser for mercury recovery. This contrasts with thermal recovery units that treat large volumes of low mercury content wastes. The still is operated under vacuum such that the gas stream after the condenser is routed through two carbon adsorption beds in series to limit mercury air emissions. The system is used only a few times per year for 1 to 2 days at a time. Due to the small volumetric flow rate and mercury concentration of the vented stream and limited operation of the still, mercury air emissions are very low from recovery in the batch purification still.

Fugitive mercury emissions can occur due to leaking equipment, liquid mercury spills, or accumulations in many locations throughout mercury cell chlor-alkali production facilities and mercury recovery facilities, including areas of maintenance activities, liquid mercury collection and handling, and storage for mercury-containing wastes. Most of these sources are associated

with cell rooms. Liquid mercury exposed to the atmosphere evaporates at a rate depending on temperature, air flow, and other variables. Methods of controlling fugitive mercury emissions include the containment of liquid mercury leaks, clean up of liquid mercury spills and accumulations, repair of equipment leaking liquid mercury, and containment of mercury-containing wastes under an aqueous liquid or in closed containers. Since liquid mercury can be visually identified, routine visual inspections are an effective method to detect these problems. Mercury vapor leaks, by comparison, are much more difficult to detect and typically result in higher emissions. Vapor leaks occur mostly at the decomposer and in the hydrogen system.

D. What are the health effects associated with mercury?

Mercury is highly toxic, persistent, and bioaccumulates in the food chain. Most people have some exposure to mercury as a result of normal daily activities. People may be exposed to mercury through inhalation of ambient air; consumption of contaminated food, water, or soil; and/or dermal exposure to substances containing mercury. Also, exposures occur as the result of dental amalgams and from various other sources.

Mercury is a naturally occurring element that is found in air, water, and soil in various inorganic and organic forms. The three primary forms of interest are elemental mercury, inorganic mercury, and methylmercury. As mercury moves through environmental media, it undergoes complex transformations.

Mercury emitted to the air from various types of sources (usually in elemental or inorganic forms) transports through the atmosphere and eventually deposits onto land or water bodies. Once deposited, natural processes can transform some of the mercury into methylmercury which is a highly toxic, more bioavailable form that biomagnifies in the aquatic food chain (such as in fish). Generally, fish consumption dominates the pathway for human and wildlife exposure to mercury.

Inhalation is the primary direct exposure route of concern for elemental mercury because this form strongly partitions to air. Absorption of elemental mercury vapor occurs rapidly through the lungs. Once absorbed, elemental mercury is readily distributed throughout the body; it crosses both placental and blood-brain barriers. The elemental mercury is oxidized to divalent mercury in most body tissues. Once elemental mercury crosses these barriers and is oxidized to divalent mercury, return to

the general circulation is impeded, and mercury can be retained in brain tissue. Effects on the nervous system appear to be the most sensitive toxicological endpoint following exposure to elemental mercury. Exposures above the threshold level can result in tremors, nervousness, insomnia, neuromuscular changes (such as weakness, muscle atrophy, and muscle twitching), headaches, polyneuropathy, and memory loss.

Inhalation and ingestion exposure routes are of interest for inorganic mercury because this form is found in air and other media such as soils and water. There is some limited information suggesting that about 40 percent of the inhaled inorganic mercury is absorbed. Absorption of inorganic mercury through the gastrointestinal tract varies with the particular mercuric salt involved. The portion that is absorbed remains in the body for a considerable length of time. The reported half-life of inorganic mercury in blood is about 20 to 66 days. There is no evidence that inorganic mercury is methylated to form methylmercury in the human body. The inorganic mercury has a limited capacity for penetrating the blood-brain or placental barriers. Limited data suggest that inorganic mercury is a possible human carcinogen. The most sensitive general systemic adverse effect due to

exposure to inorganic mercury is the formation of autoimmune glomerulonephritis (that is, inflammation of the kidney).

Ingestion is the primary exposure route of interest for methylmercury. Dietary methylmercury is almost completely absorbed into the blood and distributed to all tissues, including the brain. It also readily passes through the placenta to the fetus and fetal brain. Methylmercury has a relatively long half-life in the human body (about 70 to 80 days). Neurotoxicity is the health effect of greatest concern with methylmercury exposure. The developing fetus is considered most sensitive to the effects from methylmercury. Therefore, women of child-bearing age are the population of greatest concern. During several poisoning incidents in Minamata, Japan, in the 1950's and Iraq in the 1970's, children born of women who were exposed to high doses of methylmercury during pregnancy through ingestion of contaminated fish or grain suffered neurological harms. These harms included death, cerebral palsy, or delayed onset of walking and talking. Also, lower in utero exposures have resulted in delays and deficits in learning abilities.

E. How does this action relate to the part 61 Mercury NESHAP?

We promulgated the National Emission Standard for Mercury on April 6, 1973 (40 CFR part 61, subpart E).¹ Those standards (hereafter referred to as the Mercury NESHAP) limit mercury emissions from mercury cell chlor-alkali plants as well as mercury ore processing facilities and sludge incineration and drying plants. Specifically, the Mercury NESHAP limits mercury emissions from mercury cell chlor-alkali plants to 2,300 grams per day and requires that mercury emissions be measured (in a one-time test) from hydrogen streams, end-box ventilation systems, and the cell room ventilation system. As an alternative to measuring ventilation emissions from the cell room to demonstrate compliance, the Mercury NESHAP allows an owner or operator to assume a ventilation emission value of 1,300 grams per day of mercury providing the owner/operator adheres to a suite of approved design, maintenance and housekeeping practices.

1

This regulatory program was originally set forth at 38 FR 8826, April 6, 1973; and amended at 40 FR 48302, October 14, 1975; 47 FR 24704, June 8, 1982; 49 FR 35770, September 12, 1984; 50 FR 46294, November 7, 1985; 52 FR 8726, March 19, 1987; and 53 FR 36972, September 23, 1988.

Every mercury cell chlor-alkali plant currently in operation in the United States complies with the cell room ventilation provisions by carrying out these practices rather than by measuring mercury emissions discharged from the cell room. Since every plant uses the 1,300 grams per day assumed value for its cell room ventilation emissions, subtracting the 1,300 grams per day cell room value from the 2,300 grams per day plantwide standard effectively creates an emission limit for the combined emissions from hydrogen streams and end-box ventilation systems of 1,000 grams per day.

The requirements in today's proposed standards are more stringent than the requirements in the Mercury NESHAP. Using the 1,000 grams per day value as the baseline, we estimate that the mercury emissions would be reduced to less than 60 grams per day (on average) by the proposed rule. This represents about 94 percent reduction from the Mercury NESHAP baseline for vents. In addition, the work practice standards in today's proposal represent the most explicit compilation of practices currently employed by the industry, along with detailed recordkeeping and reporting requirements and requirements that supplement existing RCRA provisions for the storage of mercury-containing wastes. While we cannot quantify

the mercury emissions reductions that would be achieved by the proposed work practice standards, we are confident that their implementation would result in additional reductions in mercury emissions beyond that currently achieved by the existing Mercury NESHAP.

We believe that every aspect of the Mercury NESHAP that applies to mercury cell chlor-alkali plants is addressed in today's proposed 40 CFR part 63, subpart IEEEE. In fact, as discussed above, the proposed requirements are more stringent than the respective requirements in the Mercury NESHAP. Consequently, we believe that when mercury cell chlor-alkali plants are required to comply with the proposed rule as the promulgated, the requirements of the Mercury NESHAP that apply to them will no longer be relevant or applicable. Therefore, upon the proposed compliance date as indicated in §63.8186 of the proposed rule, mercury cell chlor-alkali plants will no longer have any obligation to comply with the Mercury NESHAP, nor will they be allowed to comply with the Mercury NESHAP instead of the applicable provisions in the proposed 40 CFR part 63, subpart IEEEE. Specifically, we are proposing that affected sources subject to the proposed rule would no longer be subject to §§61.52(a), 61.53(b) and (c), and

61.55(b), (c) and (d) of 40 CFR part 61, subpart E, after the compliance date which is proposed to be 2 years following the promulgation of the final rule.

II. Summary of the Proposed Standards

A. What is the source category?

The source category is Chlorine Production. However, this proposal only applies to one type of chlorine production process - the mercury cell chlor-alkali process. Today's proposal applies to all plants engaged in the manufacture of chlorine and caustic in mercury cells. Other chlor-alkali cell types used to produce chlorine and caustic, such as diaphragm cell and membrane cell technologies, would not be covered by this proposed rule because they do not emit mercury. Emissions of chlorine and HCL from all chlorine production facilities are addressed in a separate action elsewhere in today's Federal Register.

B. What are the affected sources and emission points to be regulated?

The proposed rule defines two affected sources: mercury cell chlor-alkali production facilities and mercury recovery facilities. The former includes all cell rooms and ancillary operations used in the manufacture of chlorine, caustic, and by-product hydrogen

at a plant site. The latter includes all processes and associated operations needed for mercury recovery from wastes.

Emission points addressed within mercury cell chlor-alkali production facilities include each mercury cell by-product hydrogen stream, each mercury cell end-box ventilation system vent, and fugitive emission sources throughout each cell room and various areas. Emission points addressed within mercury recovery facilities include each mercury thermal recovery unit vent and fugitive emission sources associated with storage areas for mercury-containing wastes.

C. What are the emission limitations?

For new or reconstructed mercury cell chlor-alkali production facilities, the proposed rule would prohibit mercury emissions.

For existing mercury cell chlor-alkali production facilities with end-box ventilation systems, we are proposing that aggregate mercury emissions from all by-product hydrogen streams and end-box ventilation system vents not exceed 0.067 grams of total mercury emitted per megagram of chlorine produced (grams Hg/Mg Cl₂), or 1.3×10^{-4} pounds of total mercury per ton of chlorine produced (lb Hg/ton Cl₂). For existing mercury cell

chlor-alkali production facilities without end-box ventilation systems, we are proposing that mercury emissions from all by-product hydrogen streams not exceed 0.033 grams Hg/Mg Cl₂, or 0.66×10^{-4} lb Hg/ton Cl₂. In addition, we are proposing that separate mercury concentration operating limits be established for each affected by-product hydrogen stream and each affected end-box ventilation system vent. The mercury concentration operating limits would be based only on elemental mercury, and each vent stream outlet would be continuously monitored for elemental mercury to show relative changes in mercury levels.

For new, reconstructed, or existing mercury recovery facilities with oven type mercury thermal recovery units, we are proposing that total mercury emissions not exceed 23 milligrams per dry standard cubic meter (mg/dscm) from each oven type unit vent. For new, reconstructed, or existing mercury recovery facilities with non-oven type mercury thermal recovery units, the proposed limit is 4 mg/dscm. Additionally, we are proposing that a mercury concentration operating limit (based on elemental mercury) be established concurrent with the initial performance test for each mercury thermal recovery unit vent.

D. What are the work practice standards?

We are proposing a set of work practice standards to address and mitigate fugitive mercury releases at mercury cell chlor-alkali plants. These provisions include specific equipment standards such as the requirement that end boxes either be closed (that is, equipped with fixed covers), or that end-box headspaces be routed to a ventilation system. Other examples include requirements that piping in liquid mercury service have smooth interiors, that cell room floors be free of cracks and spalling and coated with a material that resists mercury absorption, and that containers used to store liquid mercury have tight-fitting lids. The proposed work practice standards also include operational requirements. Examples of these include requirements to allow electrolyzers and decomposers to cool before opening, to keep liquid mercury in end boxes and mercury pumps covered by an aqueous liquid at a temperature below its boiling point at all times, to maintain end-box access port stoppers in good sealing condition, and to rinse all parts removed from the decomposer for maintenance prior to transport to another work area.

A cornerstone of the proposed work practice standards is the inspection program for equipment

problems, leaking equipment, liquid mercury accumulations and spills, and cracks or spalling in floors and pillars and beams. Specifically, the proposed rule would require that visual inspections for equipment problems, such as end-box access port stoppers not securely in place, liquid mercury in open containers not covered by an aqueous liquid, or leaking vent hoses, be conducted twice each day (once every 12 hours). If a problem is found during an inspection, the owner or operator would need to take immediate action to correct the problem. Monthly inspections for cracking or spalling in cell room floors would also be required as well as semiannual inspections for cracks and spalling on pillars and beams. Any cracks or spalling found would need to be corrected within 1 month.

Visual inspections for liquid mercury spills or accumulations would be required twice per day. If a liquid mercury spill or accumulation is identified during an inspection, the owner or operator would need to initiate cleanup of the liquid mercury within 1 hour of its detection. Acceptable cleanup methods would include wet vacuum cleaning, washing to a trench or canal with an aqueous liquid cover, or a suitable alternative method approved upon petition.

In addition to cleanup, the proposed rule would require that an inspection of equipment in the area of the spill or accumulation be conducted to identify the source of the liquid mercury. If the source is found, the owner or operator would be required to repair the leaking equipment as discussed below. If the source is not found, the owner or operator would be required to reinspect the area every 6 hours until the source is identified or until no additional liquid mercury is found at that location.

Inspections of specific equipment for liquid mercury leaks would be required once per day. If leaking equipment is identified, the proposed rule would require that any dripping mercury be contained and covered by an aqueous liquid, and that a first attempt to repair leaking equipment be made within 1 hour of the time it is identified. The proposed rule would require that leaking equipment be repaired within 4 hours of the time it is identified, although there are provisions for delaying repair of leaking equipment for up to 48 hours.

Inspections for hydrogen gas leaks would be required twice per day (once each 12 hours). For a hydrogen leak at any location upstream of a hydrogen header, a first attempt at repair would be required within 1 hour of

detection of the leaking equipment, and the leaking equipment would need to be repaired within 4 hours (with provisions for delay of repair if the leaking equipment is isolated). For a hydrogen leak downstream of the hydrogen header but upstream of final control, a first attempt at repair would be required within 4 hours, and complete repair would be required within 24 hours (with delay provisions if the header is isolated).

As a complement to the inspection program, the proposed rule also includes a requirement to institute a cell room monitoring program whereby owners and operators would continuously monitor mercury concentration in the upper portion of each cell room and take corrective actions as soon as practicable when elevated mercury vapor levels are detected. The proposed rule does not include detailed requirements for this program. However, we do plan to develop specific criteria for such a program which would be issued either as guidance outside of the final rule or as an amendment to the final rule.

The program would not be a continuous monitoring system inasmuch as the results would be used only to determine relative changes in mercury vapor levels rather than compliance with a cell room emission or operating limit. Generally, the owner or operator would need to

establish an action level for each cell room which would be based on preliminary monitoring to determine normal baseline conditions. The action level, or levels if appropriate, would then be established as a yet to be determined multiple of the baseline values. Once the action level(s) is established, continuous monitoring would need to be conducted. If an action level is exceeded, actions to correct the situation would need to be initiated as soon as possible. If the elevated mercury vapor level is due to a maintenance activity, the owner or operator would need to ensure that all work practices related to that maintenance activity are followed. If a maintenance activity is not the cause, inspections and other actions would be needed to identify and correct the cause of the elevated mercury vapor level.

For fugitive mercury emissions associated with storage areas for mercury-containing waste, the proposed rule would require that carbon media from decomposers and cell room sludges either be stored in closed containers or be stored in open containers under a layer of aqueous liquid that is replenished at least once per week. For all other mercury-containing wastes, the proposed rule would require that the wastes either be washed or

chemically decontaminated to remove visible mercury or be stored in closed containers.

Finally, the proposed rule would establish the duty for owners and operators to routinely wash surfaces throughout the plant where liquid mercury could accumulate. Owners and operators would be required to prepare and follow a written washdown plan detailing how and how often specific areas specified in the proposed rule would be washed down to remove any accumulations of liquid mercury.

E. What are the operation and maintenance requirements?

We are proposing that each owner and operator would always operate and maintain affected source(s), including air pollution control and monitoring equipment, in a manner consistent with good air pollution control practices at least to the levels required by the proposed rule, as required under §63.6(e)(1)(i) of the NESHAP General Provisions. The proposed rule would require each owner and operator to prepare and implement a written startup, shutdown, and malfunction plan according to the operation and maintenance requirements in §63.6(e)(3) of the NESHAP General Provisions.

F. How are initial and continuous compliance with the emission limitations to be demonstrated?

The proposed rule would require compliance with emission limitations within 2 years from [DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER].

To demonstrate initial compliance with the proposed emission limits for by-product hydrogen streams and end-box ventilation system vents, we are proposing that each owner and operator would conduct performance tests and perform specified calculations. A test would be needed for each by-product hydrogen stream using 40 CFR part 61, appendix A, Method 102. A test would also be required for each end-box ventilation system vent using 40 CFR part 61, appendix A, Method 101 or 101A. Each performance test would be conducted in accordance with a site-specific test plan prepared pursuant to the performance test quality assurance program requirements in §63.7(c)(2) of the NESHAP General Provisions. Each performance test would be comprised of at least three runs, each lasting 2 hours at a minimum. Concurrent with each test run, the quantity of chlorine produced would need to be determined according to an equation contained in the proposed rule that calculates chlorine production based on cell line electric current load. Then, the mass of mercury emitted per unit mass of chlorine produced would be calculated for each test run, and the runs would

be averaged for each tested vent. Initial compliance would be achieved if the sum of the average mass of mercury emitted per mass of chlorine produced of all by-product hydrogen streams and all end-box ventilation system vents is less than 0.067 gm Hg/Mg Cl₂ for plants with end-box ventilation systems, or if the sum of the average mass of mercury emitted per mass of chlorine produced of all by-product hydrogen streams is less than 0.033 gm Hg/Mg Cl₂ for plants without end-box ventilation systems.

To demonstrate initial compliance with the mercury thermal recovery unit emission limits, we are proposing that a performance test be conducted for each vent using Method 101 or 101A. Once again, the performance test would need to follow a site-specific test plan developed by the owner and operator according to §63.7(c)(2) of the NESHAP General Provisions. The proposed rule would require that during the test, the type of waste resulting in the highest mercury concentration in the mercury thermal recovery unit vent be processed. Documentation of the mercury content of this type of waste and an explanation of why it results in the highest mercury concentration would be required as part of the site-specific test plan. Three test runs would need to be

conducted at a point after the last control device for each vent. Initial compliance would be achieved if the average vent mercury concentration is less than 23 mg/dscm for each oven type vent or 4 mg/dscm for each non-oven type vent.

To continuously comply with the emission limit for each by-product hydrogen stream, end-box ventilation system vent, and mercury thermal recovery unit, we are proposing that each owner and operator would continuously monitor outlet elemental mercury concentration and compare the daily average results with a mercury concentration operating limit for the vent. This operating limit would be established during the required performance tests, as explained later in this section. Continuous compliance would be demonstrated by collecting outlet elemental mercury concentration data using a continuous mercury vapor monitor, calculating daily averages, and documenting that the calculated daily average values are no higher than established operating limits. Each daily average vent elemental mercury concentration greater than the established operating limit would be considered a deviation.

The proposed rule would require that each continuous mercury vapor monitor be installed, operated, and

maintained in accordance with a site-specific monitoring plan. For each monitor, this plan would need to address installation and siting, monitor performance specifications, performance evaluation procedures and calibration criteria, ongoing operation and maintenance procedures, ongoing data assurance procedures, and ongoing recordkeeping and reporting procedures.

Owners or operators would establish a mercury concentration operating limit for each by-product hydrogen stream, end-box ventilation system vent, and mercury thermal recovery unit vent as part of the initial compliance demonstration. During each performance test, the proposed rule would require that a continuous mercury vapor monitor be used to measure elemental mercury concentration in the vent stream at least once every 15 minutes for the entire duration of each performance test run. The average elemental mercury concentration measured during any valid test run conducted during the performance test in which mercury emissions did not exceed the applicable emission limit would then be established as the mercury concentration operating limit.

G. How are initial and continuous compliance with the work practice standards to be demonstrated?

The proposed rule would require compliance with the work practice standards within 2 years from [DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER]. The proposed work practice standards would primarily be requirements for ongoing operational activities. For these activities, there is no specific action called for to demonstrate initial compliance, other than a commitment by the owner or operator that the work practices standards will be met. Therefore, the major component of the initial compliance demonstration for the work practice standards would be a certification by the owner or operator that the work practice standards will be met. In addition, there are a few requirements that could cause an owner or operator to install new equipment or upgrade existing equipment. Documentation of any such actions would also be required in the initial compliance demonstration.

The proposed rule contains specific recordkeeping requirements related to the work practice standards. These include records of when inspections were conducted, problems identified, and actions taken to correct problems. Continuous compliance with work practice standards would be demonstrated by maintaining these required records.

Initial compliance with the washdown plan would be demonstrated by submission of the plan by the owner or operator and certification that they operate according to, or will operate according to, the plan. Continuous compliance with the plan would be demonstrated by maintaining related records. Records would also be required to demonstrate compliance with the cell room monitoring program.

H. What are the notification and reporting requirements?

The proposed rule would require that owners or operators submit the following notifications and reports:

- ! Initial Notification
- ! Notification of Intent to conduct a performance test
- ! Notification of Compliance Status (NOCS)
- ! Compliance reports.

For the Initial Notification, we are proposing that each owner or operator notify us that their plant is subject to the NESHAP for mercury cell chlor-alkali plants, and that they provide other basic information about the plant. For existing sources, this notification would need to be submitted no later than [DATE 120 CALENDAR DAYS AFTER PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER].

For the Notification of Intent report, we are proposing that each owner or operator notify us in writing of the intent to conduct a performance test at least 60 days before the performance test is scheduled to begin.

The Notification of Compliance Status for the work practice standards would be due [DATE 30 DAYS AFTER THE PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER] for existing sources. In this notification, the owner or operator would need to certify that the work practice standards are being or will be met. Furthermore, we are proposing that the washdown plan be submitted as part of this notification, and that the owner or operator certify that they operate or will operate according to the plan.

For the emission limits where a performance test is required to demonstrate initial compliance (that is, the emission limits for by-product hydrogen streams and end-box ventilation system vents and the mercury thermal recovery unit vent limits), the tests would have to be conducted within 180 days after the compliance date, and the Notification of Compliance Status would be due 60 days after the completion of the performance test. We are proposing that the site-specific plan addressing the

use of continuous mercury vapor monitors for vents be submitted as part of this notification.

Reporting on continuous compliance would be required semiannually, with the first report due within the first 6 months after initial compliance.

I. What are the recordkeeping requirements?

Records required by the proposed rule related to by-product hydrogen streams, end-box ventilation system vents, and mercury thermal recovery unit vents include the following: performance test results, records showing the establishment of the applicable mercury concentration operating limits (including records of the mercury concentration monitoring conducted during the performance tests), records of the continuous mercury concentration monitoring data, records of the daily average elemental mercury concentration values, and records associated with site-specific monitoring plans.

With regard to the work practice standards, the proposed rule would require that records be maintained to document when each required inspection was conducted and the results of each inspection. Records noting equipment problems (such as end-box cover stoppers not securely in place or mercury in an open container not covered by an aqueous liquid) identified during a required inspection

and the corrective action taken would also be required. If equipment that is leaking mercury liquid or hydrogen/mercury vapor is identified during a required inspection or at any other time, the proposed rule would require records of when the leak was identified and when it was repaired. Similarly, if a mercury spill or accumulation is identified at any time, the proposed rule would require records of when the spill or accumulation was found and when it was cleaned up.

A copy of the current version of the washdown plan would need to be kept on-site and be available for inspection. Records of when washdowns were conducted would be required.

The proposed rule would require that copies of each notification and report that is submitted to comply with this subpart be kept and maintained for 5 years, the first 2 of which must be on-site.

III. Rationale for Selecting the Proposed Standards

A. How did we select the source category?

The mercury cell chlor-alkali production portion of the chlorine production source category was among the categories and subcategories of major and area sources listed for regulation under section 112(c)(6) of the CAA (63 FR 17838, April 10, 1998) to assure that sources

accounting for not less than 90 percent of the aggregate mercury emissions nationwide are subject to standards under section 112(d). We estimate that mercury cell chlor-alkali production accounts for over 5 percent of all stationary source emissions of mercury and over 25 percent of the emissions from stationary noncombustion sources. The Chlorine Production source category is comprised of 43 facilities engaged in the manufacture of chlorine and caustic in electrolytic cells. Cell types employed include the diaphragm cell, membrane cell, and mercury cell. Of these, only the mercury cell process has the potential to emit mercury. For the 1997 base year of the MACT analysis, twelve facilities employed mercury cells. We are aware that one of the twelve facilities ceased operations permanently in September 2000. Nonetheless, we considered it to be part of the source category for the development of MACT since it was in operation in 1997.

B. How did we select the affected sources and emission points to be regulated?

For the purposes of implementing NESHAP, an affected source is defined to mean the stationary source, the group of stationary sources, or the portion of a stationary source that is regulated by relevant standards

or other requirements established under section 112 of the CAA. An affected source specifies the group of unit operations, equipment, and emission points that are subject to the standards. We can define an affected source as narrowly as a single piece of equipment or as broadly as all equipment at a plant site.

We decided to separate the unit operations and emission points related to the production of chlorine and caustic from the unit operations and emissions points related to mercury recovery. Mercury cell chlor-alkali production facilities include a number of integrated operations dedicated to the production, storage, and transfer of product chlorine, product caustic, and by-product hydrogen. In contrast, mercury recovery facilities are operations dedicated to the recovery of mercury from mercury-containing wastes. These operations are independent of the chlor-alkali process and are thus not integral to production. As a result, the proposed rule addresses emissions from two separate affected sources: mercury cell chlor-alkali production facilities and mercury recovery facilities.

Unit operations and emission points grouped within the mercury cell chlor-alkali production facilities affected source are by-product hydrogen streams, end-box

ventilation system vents, and fugitive mercury emissions associated with cell rooms, hydrogen systems, caustic systems, and storage areas for mercury-containing wastes. As described previously, each is a potentially significant source of mercury emissions. Chlorine purification, brine preparation, and wastewater treatment operations are believed to have low mercury emissions to the air. Accordingly, today's proposal contains no requirements for these operations.

Unit operations and emission points grouped within the mercury recovery facilities affected source include all mercury thermal recovery unit vents and fugitive mercury emissions associated with mercury-containing waste storage areas. Chemical mercury recovery and recovery in a batch purification still are believed to have low mercury emissions to the air. Accordingly, today's proposal contains no requirements for these operations.

C. How did we select the form of the standards?

Section 112 of the CAA requires that standards be specified as numerical emission standards, whenever possible. However, if it is determined that it is not feasible to prescribe or enforce a numerical emission standard, section 112(h) indicates that a design,

equipment, work practice, or operational standard may be specified.

With the exception of standards for fugitive emission sources, we are proposing numerical emission limits for all other mercury emission sources. Specifically, the proposed standards include numerical emission limits for by-product hydrogen streams, end-box ventilation system vents, and mercury thermal recovery unit vents.

Cell rooms bring together mercury, a large electrical load, and hot production equipment. Accordingly, most fugitive mercury emission sources at mercury cell chlor-alkali plants are associated with cell rooms. Reliable quantification of these cell room fugitive emissions would be costly, owing to the need to measure both mercury vapor concentration and air flow rate at ceiling apertures with sophisticated equipment. Some plants have many separate ceiling apertures, and plants in warm climates tend to be little enclosed on the sides. Moreover, levels of fugitive mercury vary with cell room operations, precluding the setting of a numerical limit.

Mercury cell chlor-alkali plant fugitive mercury emission sources are also associated with storage areas

for mercury-containing wastes. The measurement of mercury emissions from mercury-containing waste storage areas is also impracticable as these are usually located in several places throughout a plant, many of which are open areas.

Not unexpectedly, emissions data on cell room and waste storage emissions are very limited as in the case of cell rooms, or nonexistent as in the case of waste storage areas. As such, we believe that it is not feasible to either prescribe or enforce numerical emission limit(s) for fugitive mercury emissions from cell rooms and waste storage areas. Consequently, today's proposed standards address fugitive emission sources at mercury cell chlor-alkali plants through the establishment of work practice standards.

D. How did we determine the basis and level of the proposed standards for existing sources?

Section 112 of the CAA establishes a minimum baseline or "floor" for MACT standards. For new sources, the standards for a source category or subcategory cannot be less stringent than the emission control that is achieved in practice by the best-controlled similar source. The standards for existing sources may be less stringent than standards for new sources, but they cannot

be less stringent than the average emission limitation achieved by the best-performing 12 percent of existing sources for categories and subcategories with 30 or more sources, or the average emission limitation achieved by the best-performing five sources for categories or subcategories with fewer than 30 sources for which the Administrator has emissions information.

After the floor has been determined for a category or subcategory, the Administrator must set MACT standards that are technically achievable and no less stringent than the floor. Such standards must then be met by all sources within the category or subcategory. The regulatory alternatives selected for new and existing sources may be different because of different MACT floors, and separate emission limits may be established for new and existing sources.

The EPA generally determines the MACT floor and then considers beyond-the-floor control options. Here, EPA considers the achievable reductions in emissions of HAP (and possibly other pollutants that are co-controlled), cost and economic impacts, energy impacts, and other non-air environmental impacts. The objective is to achieve the maximum degree of HAP emission reduction without incurring unreasonable cost or other impacts.

1. By-product Hydrogen Streams and End-Box Ventilation System Vents

The fundamental unit in the mercury cell chlor-alkali process is a mercury cell. The by-product hydrogen stream and the end-box ventilation system vent represent the mercury emission point sources that originate from a mercury cell. As discussed earlier, hydrogen gas is incidentally produced as a result of the catalyzed reaction of sodium/mercury amalgam and deionized water to produce caustic in a decomposer. The end-box ventilation stream is a collection of vapors from head spaces of end boxes and possibly other vessels, including pump tanks and seal legs, wash water tanks, and caustic tanks and headers. The mercury content of the by-product hydrogen stream and the end-box ventilation stream, prior to control, is a direct function of the design of the mercury cell. Ten different mercury cell models are used by the twelve mercury cell chlor-alkali plants. Given these differences in cell design and their effect on potential vent mercury emissions, we opted to develop a cell-wide standard for mercury emissions from both points.

Given the large variation among the plants in terms of production capacity (the largest plant is capable of

producing over five times as much chlorine as the smallest) and mercury emissions potential, we concluded that any equitable assessment of MACT should account for this disparity. We selected the actual amount of chlorine produced by weight as the uniform parameter for our analysis for the following reasons: chlorine is the primary product generated; chlorine production can be accurately determined; and chlorine and hydrogen are generated in the same stoichiometric quantities, that is one molecule of hydrogen is produced for each molecule of chlorine produced.

We then considered the fact that two plants do not have end-box ventilation systems. Both plants operate cells with closed end boxes. Consequently, there is no need for end-box ventilation and, therefore, no end-box ventilation system emission point. Next, we examined whether the mercury cells at the ten plants equipped with end-box ventilation systems could be reconfigured with closed end boxes. We concluded that the use of an end-box ventilation system is an inherent feature of the original design of a cell, and that it is not technically feasible to eliminate end-box ventilation systems at these plants. We have, therefore, decided to distinguish

plants with end-box ventilation systems and plants without these systems for purposes of establishing MACT.

Accordingly, we are proposing, for plants with end-box ventilation systems, a single emission limit for mercury emissions from all by-product hydrogen streams and mercury emissions from all end-box ventilation system vents in units of mass of mercury emissions per mass of chlorine produced. For plants without end-box ventilation systems, we are proposing an emission limit for mercury emissions from all by-product hydrogen streams in units of mass of mercury emissions per mass of chlorine produced.

! Emission Limit for Plants With End-Box Ventilation Systems

In order to establish MACT for the combined mercury emissions from by-product hydrogen streams and end-box ventilation system vents, we relied on estimates of annual mercury emissions for each vent and information on annual chlorine production provided by the ten plants with end-box ventilation systems. A total of twenty mercury emission estimates were provided, one emission estimate for all by-product hydrogen streams and one emission estimate for all end-box ventilation system vents at each of the ten plants. Background information

on these emission estimates is available in the docket to this rulemaking (No. A-2000-32).

Of the twenty emission estimates, fourteen (six for by-product hydrogen streams and eight for end-box ventilation system vents) are based on stack tests performed in accordance with established EPA reference methods specific to chlor-alkali plants. These include Method 101 for the determination of particulate and gaseous mercury from air streams (i.e., end-box ventilation system vents) and Method 102 for the determination of mercury in hydrogen streams. We obtained and reviewed copies of all available test reports and determined that the tests were conducted correctly. Six emission estimates (four for by-product hydrogen streams and two for end-box ventilation system vents) are based on periodic measurements of mercury concentration in the vent streams. The methods used for these periodic measurements are largely modifications of EPA reference test methods. As such, we believe that they provide reasonably accurate results consistent with what would otherwise be obtained with the EPA reference test methods. Our conclusion is that these data represent the best information available on mercury

emissions from these vents, and that they are appropriate for use in establishing MACT.

The MACT floor was calculated as follows. For each plant, we divided the sum of the reported annual mercury emissions from all by-product hydrogen streams and end-box ventilation system vents by the annual chlorine production. The chlorine production values used are largely representative of actual annual chlorine production levels. We then ranked the plants from lowest to highest emitters for combined normalized mercury emissions. The normalized mercury emission values range from 0.067 grams Hg/Mg Cl₂ to 3.41 grams Hg/Mg Cl₂. We should note that the lowest value, 0.067 grams Hg/Mg Cl₂, is from the plant that closed permanently in September 2000. Nonetheless, we believe that it is appropriate to retain it in the pool of existing sources used to determine existing source MACT. Prior to closure, this plant was the lowest-emitting and best-performing source. The average (mean) of the best (lowest) five normalized values results in a floor value for existing sources of 0.14 grams Hg/Mg Cl₂.

Of the ten plants with by-product hydrogen streams and end-box ventilation systems, we project that seven would need to install additional controls or upgrade

existing controls to meet the 0.14 grams Hg/Mg Cl₂ floor level. We assume the following plant-specific actions: two plants would need to install new carbon adsorbers on their by-product hydrogen streams (one plant would be replacing an existing adsorber with a new, larger adsorber); one plant would need to install a new packed scrubber on its end-box ventilation system vent; three plants would need to install new controls on both their by-product hydrogen streams and end-box ventilation system vents; and one plant would need to both upgrade carbon adsorber control on its by-product hydrogen stream by switching to impregnated carbon and replacing carbon more frequently as well as install a new packed scrubber on its end-box ventilation system vent.

We estimate that the total aggregate installed capital control costs needed to meet the existing source MACT floor for the seven affected plants to be about \$660,000. We estimate total aggregate annual control costs, including costs for labor, materials, electricity, capital recovery, taxes, insurance, and administrative charges (excluding costs for monitoring, reporting, and recordkeeping) for the seven affected plants to be about \$570,000 per year. Mercury emission reductions against actual emissions would total 556 kg/yr (1,225 lbs/yr) for

the seven affected plants. Mercury emission reductions against the potential-to-emit baseline, as represented by the allowable emissions under the Mercury NESHAP, would total over 3,400 kg/yr (over 7,500 lbs/yr) for the seven affected plants. The associated annual cost per unit of mercury emission reduction values would be approximately \$465 per pound (actuals baseline) and under \$80 per pound (potential-to-emit baseline), respectively.

Water pollution impacts due to the increased use of packed bed scrubbers involving aqueous hypochlorite scrubbing solution on end-box ventilation systems are estimated to total 1.2 million liters (320 thousand gallons) of additional wastewater. Impacts on solid waste due to increased use of carbon adsorption for by-product hydrogen streams are estimated to total 17 megagrams per year (Mg/yr), 19 tons per year (tpy), of mercury-containing spent carbon. Energy requirements are estimated to total an additional 878 thousand kilowatt-hours per year (kW-hr/yr). Estimated secondary air pollution impacts due to heightened energy consumption total 282 Mg/yr (311 tpy), with carbon dioxide emissions comprising 99 percent of the estimate.

We then examined beyond-the-floor MACT options. We selected the lowest normalized value among the ten

plants, namely 0.067 grams Hg/Mg Cl₂, as a beyond-the-floor option. As noted above, this 0.067 grams Hg/Mg Cl₂ value is from a plant that is now closed. Nonetheless, as stated previously, we believe it is appropriate to retain it in the pool of existing sources and to include it in the beyond-the-floor assessment.

The 0.067 grams Hg/Mg Cl₂ value corresponds to 0.05 grams Hg/Mg Cl₂ from the by-product hydrogen stream controlled by a condenser coupled with a molecular sieve adsorber, and 0.017 grams Hg/Mg Cl₂ from the end-box ventilation system vent, also controlled by a condenser coupled with a molecular sieve adsorber. It is our understanding that molecular sieve technology for mercury vapor emission control is no longer commercially available. We, thus, acknowledge some uncertainty associated with the achievability of this level of control. However, for the reasons set forth below, we believe that other technologies and operating practices exist that can achieve this level of emissions control.

Due to the very low volumetric flow rates associated with both by-product hydrogen streams and end-box ventilation system vents (typically less than 5,000 scfm and 4,500 scfm, respectively), we believe that the retrofit of control equipment to reduce mercury emissions

is both practical and reasonable. We project that the nine plants with baseline emissions greater than 0.067 grams Hg/Mg Cl_2 would meet the 0.067 grams Hg/Mg Cl_2 beyond-the-floor option through the installation of new controls or the upgrading of existing controls. We assume the following plant-specific actions: two plants would need to install new carbon adsorbers on their by-product hydrogen streams (one plant would be replacing an existing adsorber with a new, larger adsorber); three plants would need to install a new packed scrubber on their end-box ventilation system vents; three plants would need to install new controls on both their by-product hydrogen streams and end-box ventilation system vents; and one plant would need to both upgrade existing carbon adsorber control on its by-product hydrogen stream by switching to impregnated carbon and replacing carbon more frequently as well as install a new packed scrubber on its end-box ventilation system vent. We project that the five new carbon adsorbers would need to accommodate a 25 percent higher carbon charge than assumed to meet the floor option. Upgrades to existing carbon adsorber control would involve more frequent carbon replacement than that assumed to meet the floor option. Five of the seven new packed scrubbers on end-box ventilation systems

would need to be operated more efficiently than assumed to meet the floor option.

In evaluating regulatory options that are more stringent than the floor, we must consider the cost of achieving such emission reductions, and any non-air quality health and environmental impacts and energy requirements. The beyond-the-floor option would result in an additional 76 kg/yr (168 lb/yr) of total mercury emission reductions for the nine affected plants (a 48 percent incremental reduction from the floor option). For the nine affected plants, the incremental installed capital costs are estimated to total around \$210,000, and the incremental annual costs are estimated to total around \$150,000 per year. The incremental cost per unit of incremental mercury emission reduction is \$900 per pound.

The incremental water pollution impacts are estimated to total 550 thousand liters (145 thousand gallons) of additional wastewater. The incremental solid waste impacts are estimated as 5.1 Mg/yr (5.6 tpy) of mercury-containing spent carbon in total. The incremental energy impacts are estimated as 110 thousand kW-hr/yr in total. The incremental secondary air pollution impacts are estimated to total 35 Mg/yr

(39 tpy), with carbon dioxide emissions comprising 99 percent of the estimate.

We believe the additional emission reductions that would be achieved by the beyond-the-floor option are warranted. Further, we believe that the incremental costs of achieving such emission reductions, as well as incremental non-air environmental impacts and energy requirements, are reasonable for mercury. Therefore, we selected the 0.067 grams Hg/Mg Cl₂ beyond-the-floor option as MACT for plants with end-box ventilation systems.

If comments are received on this proposal that lead us to conclude that this level of control is unachievable, we retain the option of setting the standard at the next lowest normalized emission value. Accordingly, we have evaluated the impacts of an alternative 0.076 grams Hg/Mg Cl₂ mercury emission limit for plants with end-box ventilation systems.

We project that the eight plants with baseline emissions greater than 0.076 grams Hg/Mg Cl₂ would need to install new controls or upgrade existing controls to meet this level. This would result in an additional 65 kg/yr (143 lb/yr) of total mercury emission reductions for the eight affected plants (a 41 percent incremental reduction) from the floor option. We assume the same

plant-specific actions as those assumed to meet the 0.067 grams Hg/Mg Cl₂ value, given the small difference in emission reductions at the two levels. For the eight affected plants, the incremental installed capital costs are estimated to total around \$197,000, and the incremental annual costs are estimated to total around \$125,000 per year. The incremental cost per unit of incremental mercury emission reduction is \$875 per pound.

The incremental water pollution impacts are estimated to total 317 thousand liters (84 thousand gallons) of additional wastewater. The incremental solid waste impacts are estimated as 5.1 Mg/yr (5.6 tpy) of mercury-containing spent carbon in total. The incremental energy impacts are estimated as 105 thousand kW-hr/yr in total. The incremental secondary air pollution impacts are estimated to total 34 Mg/yr (37 tpy), with carbon dioxide emissions comprising 99 percent of the estimate.

! Emission Limit for Plants Without End-Box
Ventilation Systems

In order to establish MACT for mercury emissions from by-product hydrogen streams for the two plants without end-box ventilation systems, we used estimates of annual mercury emissions from by-product hydrogen streams

and information on actual chlorine production provided by the two plants for 1997. Both emission estimates are based on periodic measurements of mercury concentration in the vent streams obtained using methods that are largely modifications of EPA reference test methods. Background information on these emission estimates is available in the docket to this rulemaking (No. A-2000-32).

For each plant, we divided the reported annual mercury emissions from by-product hydrogen streams by the annual chlorine production. The normalized values are 0.033 grams Hg/Mg Cl₂ and 0.17 grams Hg/Mg Cl₂. Although there are fewer than five sources from which to constitute a MACT floor, we opted to take the average (mean) of the two normalized values, resulting in 0.10 grams Hg/Mg Cl₂ as the floor value for existing sources. We project that the higher emitting plant would need to upgrade existing controls to meet the 0.10 grams Hg/Mg Cl₂ floor level. Specifically, the carbon in its existing carbon adsorbers would need to be replaced more frequently. There would be no capital costs as more frequent carbon media replacement is only a recurring annual cost estimated at \$13,000 per year. Mercury emission reductions against actual emissions would total

6 kg/yr (14 lbs/yr). Mercury emission reductions against the potential-to-emit baseline, as represented by the allowable emissions under the Mercury NESHAP, would total over 600 kg/yr (over 1,300 lbs/yr). The associated annual cost per unit of mercury emission reduction values would be approximately \$940 per pound and less than \$10 per pound, respectively. There are no associated secondary air pollution, water pollution, or energy impacts. Estimated solid waste impacts due to increased use of carbon adsorption total 1.0 Mg/yr (1.1 tpy).

We then examined beyond-the-floor MACT options. We selected the lowest normalized value among the two plants, namely 0.033 grams Hg/Mg Cl_2 , as a beyond-the-floor option. Controls applied to achieve this value include a condenser coupled with a carbon adsorber. For purposes of estimating impacts, we assumed that the higher-emitting plant would replace its existing carbon adsorber with a new, larger adsorber to meet the 0.033 grams Hg/Mg Cl_2 level.

In evaluating regulatory options that are more stringent than the floor, we must consider the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements. The beyond-the-floor option would result

in an additional 6 kg/yr (14 lb/yr) of total mercury emission reductions (a 47 percent incremental reduction from the floor option). The incremental installed capital costs are estimated to total around \$182,000. The incremental annual costs are estimated to total around \$126,000 per year. The incremental cost per unit of incremental mercury emission reduction is approximately \$9,000 per pound. There are no associated incremental water pollution impacts. The estimated incremental solid waste impacts total an additional 5.3 Mg/yr (5.8 tpy) of mercury-containing spent carbon. The incremental energy impacts are estimated as 252 thousand kW-hr/yr in total. The incremental secondary air pollution impacts are estimated to total 81 Mg/yr (89 tpy), with carbon dioxide emissions comprising 99 percent of the estimate.

We believe the additional emission reductions that would be achieved by the beyond-the-floor option are warranted. Further, we believe that the incremental costs of achieving such emission reductions as well as incremental non-air environmental impacts and energy requirements are reasonable for mercury. Therefore, we selected the 0.033 grams Hg/Mg Cl₂ level as MACT for plants without end-box ventilation systems, which is

approximately half the level selected for plants with end-box ventilation systems.

2. Sources of Fugitive Mercury Emissions

As explained above, we have determined that work practice standards provide the most appropriate approach for addressing fugitive mercury emissions at mercury cell chlor-alkali plants. Every mercury cell chlor-alkali plant is currently subject to the Mercury NESHAP and implements the design, maintenance, and housekeeping practices referenced in the NESHAP to control fugitive cell room emissions. We believe that these existing requirements represent the MACT floor for existing mercury fugitive emission sources. Since these floor requirements are currently observed at each existing plant, a standard based on this floor level of control would not be expected to reduce mercury emissions from current levels or produce any associated cost, non-air environmental or energy impacts.

We then examined beyond-the-floor options. We noted that many of the existing work practice requirements are general in nature and nonspecific relative to the frequency and scope of inspections, as well as recordkeeping and reporting. We decided that clarification and elaboration on these general practices

was warranted to make them more explicit and to improve assurance of compliance. Accordingly, we initiated a thorough examination of specific measures employed across the industry to limit fugitive mercury emissions.

In the summer of 1998, we conducted site visits to five mercury cell chlor-alkali plants to observe and document their design, operational, maintenance, housekeeping, and recordkeeping practices. The five plants were selected to provide a broad representation of ownership (the five plants are owned by five different companies) and different mercury cell models (mercury cells made by all three manufacturers and of varying sizes are represented). We also selected plants in different areas of the United States (U.S.) to account for geographical variations such as climate. In addition to the site visits, we obtained current standard operating procedures for mitigating sources of fugitive mercury emissions from all twelve plants. We used this knowledge and information to develop a detailed compilation of practices currently used across the industry to control fugitive mercury emissions.

We used this compilation to identify explicit practices for each individual plant area, equipment type, and inspection procedure and assembled them as beyond-

the-floor work practice requirements. We feel that the resulting work practice standards represent the most stringent practices applied in the industry.

The types of enhancements from the MACT floor level requirements that are included in the beyond-the-floor option may be generally classified in three categories. First, the beyond-the-floor requirements add considerable specificity. The equipment and areas to be inspected are identified along with the required frequency of the inspections and the conditions that trigger corrective action. Response time intervals for when the corrective actions must occur are also included. Second, some types of inspections are required at more frequent intervals than required by the Mercury NESHAP (e.g., inspecting decomposers for hydrogen leaks once each 12 hours rather than once each day). Third, the beyond-the-floor option includes additional requirements not included in the floor level. The two most obvious examples are the detailed recordkeeping procedures and reporting provisions which are more fully developed than those in the Mercury NESHAP and the requirements for storage of mercury-containing wastes.

Also included in the beyond-the-floor option is a requirement for owners and operators to develop and

implement a plan for the routine washdown of accessible surfaces in the cell room and other areas. All plants currently wash down cell room surfaces regularly.

However, due to plant-specific considerations, we are uncomfortable with issuing a specific set of requirements for washdowns that would apply at all plants. As a result, the beyond-the-floor option establishes the duty for owners or operators to prepare and implement a written plan for washdowns and identifies elements to be addressed in the plan. Although washdowns are an ongoing practice at all plants, we believe that including such a requirement in the beyond-the-floor option will elevate the importance of washdowns as part of an overall approach to reducing cell room fugitive emissions.

As a final element of the beyond-the-floor option, we considered the extent to which measurement of ambient mercury levels in the cell room air should be incorporated. Currently, all mercury cell chlor-alkali plants periodically monitor mercury vapor levels at the cell room floor plane, in keeping with Occupational Safety and Health Administration (OSHA) standards for worker exposure to mercury. Typically, on a daily basis, a plant operator measures and records the mercury vapor level in the cell room. Some plants use technologies

that measure the mercury vapor level at a single point, such as portable mercury vapor analyzers based on ultraviolet light absorption or gold film amalgamation detection. Plant operators using these technologies take readings at specified locations in the cell room. Other plants utilize procedures that provide an aggregate reading, such as chemical absorption into potassium permanganate solution followed by separate cold vapor atomic absorption analysis in a laboratory setting. This composite sample is most often obtained by a plant operator walking through the cell room with a small sampling pump.

When a mercury vapor level above the OSHA personal exposure limit is measured, plant operators require the use of respirators in the area. They also take action to determine and eliminate the cause of the elevated mercury level.

Given the fact that all plants conduct cell room mercury vapor measurements, we determined that it was appropriate to include requirements to conduct cell room monitoring as a means to identify and correct situations resulting in elevated mercury levels (and obviously, increased mercury emissions) as part of the beyond-the-floor option for fugitive mercury emission sources. We

considered basing such a program on periodic measurement, which would correspond to the programs currently in place at mercury cell chlor-alkali plants. We also considered basing such a program on the continuous measurement of mercury vapor levels in the upper portions of the cell room. We are aware of technologies, including extractive, cold vapor spectroscopy systems and open-path, differential optical absorption spectroscopy systems, designed for such continuous monitoring applications. In August of 2000, we studied cell room mercury vapor levels at a U.S. mercury cell chlor-alkali plant using both extractive and open-path technologies. In addition, we are aware of extractive systems currently in use in Europe for this purpose.

Upon consideration of the benefits of periodic versus continuous monitoring of the cell room mercury vapor levels, we selected continuous monitoring as part of the proposed cell room monitoring program for the following reasons. First, we believe that continuous monitoring would identify hydrogen leaks or other situations that result in elevated mercury levels in the cell room much more promptly than periodic monitoring. If periodic monitoring was conducted on a daily basis, hours could pass before such a leak was detected. We

also believe that the continuous monitoring of mercury vapor levels during maintenance activities would provide information to help plant operators refine and improve such maintenance activities to reduce mercury emissions.

Finally, we believe that the monitoring on the cell room floor plane could fail to detect hydrogen leaks or other situations resulting in mercury vapor leaks that may occur at higher elevations. Continuous monitoring in the upper portion of the cell room would provide a representation of all areas of the cell room at all levels.

Therefore, we have included a program involving the continuous monitoring of mercury vapor levels in the cell room as part of the beyond-the-floor option. We envision the basic elements for this program to be as follows. Each owner or operator would be required to install a mercury monitoring system in each cell room and continuously monitor the elemental mercury concentration in the upper portion of the cell room. The type of technology, whether an extractive, cold vapor spectroscopy system or an open-path, differential optical absorption spectroscopy system, would be at the discretion of the owner or operator, provided that performance criteria, such as a minimum detection limit,

were met. A sampling configuration would be specified to acquire a composite measurement representative of the entire cell room air. For example, the sampling configuration may involve sampling at least three points along the center aisle of the cell room and above the mercury cells at a height sufficient to ensure representative readings.

For each cell room, the owner or operator would need to establish an action level which would be based on preliminary monitoring to determine normal baseline conditions. The onset and duration of this preliminary monitoring would be specified as well as guidelines for setting the action level. Continuous monitoring would commence after a specified time period following establishment of the action level and its documentation in a notification to us. A minimum data acquisition requirement would be established, such as a requirement to collect and record data for at least a certain percent of the time in any 6-month period.

Actions to correct the situation as soon as possible would be required when measurements above the action level were obtained over a defined duration, such as a certain number of consecutive measurements or an average over a certain time period above the action level. If

the elevated mercury vapor level was due to a maintenance activity, the owner or operator would need to keep records describing the activity and verifying that all work practices related to that maintenance activity are followed. If a maintenance activity was not the cause, then inspections and other actions would need to be conducted within specific time periods to identify and correct the cause of the elevated mercury vapor level.

In evaluating whether to establish the beyond-the-floor option as MACT, we looked at the incremental impacts on emissions, cost, energy, and other non-air effects. Relative to emissions, we firmly believe that although we are unable to actually quantify the reductions expected with the implementation of the beyond-the-floor option, substantial reductions would nonetheless occur. We know from experience and inference that the added scrutiny inherent in the suite of beyond-the-floor practices will of necessity result in fewer fugitive emissions. In considering the cost impacts of the beyond-the-floor option, we attempted to estimate the cost associated with the equipment needed to carry out cell room monitoring as well as increased demand for labor and overhead needed to fully implement the proposed monitoring, inspection, recordkeeping, and reporting

activities. We estimate the total installed capital costs needed to meet the beyond-the-floor option for fugitive mercury emissions to be around \$663,000. We estimate the total annual costs to be around \$840,000 per year, consisting of about \$94,000 for annualized capital expenditure on mercury monitoring systems; about \$736,000 per year for labor for monitoring, inspections, and recordkeeping, about \$2,100 per year for mercury monitoring system utilities, and about \$7,500 per year for mercury monitoring system replacement parts. We are unable to estimate increases in wastewater associated with washdown and cleanup activities for liquid mercury spills and accumulations as well as increases in solid waste since these would be highly plant-specific. Energy requirements for mercury monitoring systems are estimated to total an additional 53 thousand kW-hr/yr. Estimated secondary air pollution impacts due to heightened energy consumption total 17 Mg/yr (19 tpy), with carbon dioxide emissions comprising 99 percent of the estimate.

We believe the additional emission reductions that would be achieved by the beyond-the-floor option are warranted and that the estimated incremental costs to meet this level are reasonable. Therefore, we are

selecting the beyond-the-floor work practice standards as MACT for fugitive mercury emission sources.

With regard to the cell room monitoring program, we acknowledge that there are uncertainties associated with the use of mercury monitoring systems for continuous monitoring that can only be addressed through actual field validation. We are specifically requesting comment on the feasibility of using such systems for continuous monitoring to prompt corrective actions for elevated mercury vapor levels in the cell room. We are also requesting comment on the detailed elements of the cell room monitoring program which we are unable to delineate in its entirety at this time.

Following proposal, we will involve the public in defining this program. Specifically, we will enter into a joint effort with industry, monitoring instrument suppliers, and other interested parties, to detail the elements and requirements of this program. We will take additional appropriate rulemaking steps as necessary to fully implement this program, including assuring opportunity for industry and the public to comment.

3. Mercury Thermal Recovery Unit Vents

As previously discussed, nine of the twelve mercury cell chlor-alkali plants have mercury recovery processes.

Six of the nine plants operate a thermal recovery unit in which mercury-containing wastes are heated and the resulting mercury-laden off-gas is cooled and treated for mercury removal prior to being discharged to the atmosphere. Two plants recover mercury with a chemical process and one plant recovers mercury in a purification still; in both cases, mercury air emissions are believed to be low.

In establishing MACT for mercury thermal recovery units, we obtained information from all six plants with these units. Each plant provided descriptions of its thermal recovery operation, including the types of wastes processed and the control devices applied. Where available, plants also provided results of performance testing or periodic sampling and an estimate of their mercury emissions.

Each of the six plants operates one or more retorts (as part of its mercury thermal recovery unit) in which mercury-containing wastes are heated to a temperature sufficient to volatilize the mercury. The off-gas containing mercury vapor is then cooled in the mercury recovery/control system, causing the mercury to condense to liquid. The liquid mercury condensate is then collected from recovery devices for reuse in the mercury

cells. The primary emission source is the mercury thermal recovery unit vent where off-gas that has passed through the recovery/control system is discharged to the atmosphere. Retorts used include three basic designs: batch oven (three plants), rotary kiln (two plants), and single hearth (one plant).

The batch ovens are D-tube retorts which are so named because each resembles an uppercase letter "D" on its side. Pans are filled with waste, typically around 10 cubic feet, and then placed into an oven. After inserting three or four pans, the oven door is closed and the retort is indirectly heated to about 1,000°F. The residence time varies from about 24 to 48 hours, depending on the type of waste being processed. While heating, the oven is kept under a vacuum and the mercury vapors are pulled into the mercury recovery/control system. After the cycle is completed, the unit is allowed to cool and the pans are then removed.

The rotary kilns are long, refractory-lined rotating steel cylinders in which the waste charge to be treated flows counter current to hot combustion gases used for heating. Wastes to be treated are conveyed into a ram feeder which inserts a waste charge into the kiln at regular intervals, typically about every 5 minutes. Each

is directly fired with natural gas and is heated to over 1300°F. The rotation of the kiln provides for mixing and transfer of the waste to the discharge end. The residence time is about 3 hours. The gas stream leaving the kiln passes through an afterburner where the temperature is increased to around 2,000°F to complete combustion reactions involving sulfur and carbon and then to a mercury recovery/control system.

The single hearth retort is comprised of a vertically mounted, refractory lined vessel with a single hearth and a rotating rabble. Waste is charged onto the hearth through a charge door by way of a conveyor. Once charged, the conveyor is withdrawn, the charge door is closed, and the heating or treatment cycle begins. The waste is stirred by the rabble rake, which turns continuously, and is heated to around 1,350°F. The residence time, which ranges according to waste type, is typically much longer than for rotary kilns. Similar to rotary kilns, the gas stream leaving the hearth retort passes through an afterburner where the temperature is increased to around 2,000°F to complete combustion reactions involving sulfur and carbon and then to a mercury recovery/control system.

As noted above, there are several important differences between the oven retorts and the non-oven (rotary kiln and single hearth) retorts related to operating temperature and residence time. There are also significant differences in the volumetric flow rates produced by the oven and the non-oven retorts. Oven retorts typically have volumetric flow rates around 100 scfm, which is an order of magnitude lower than flow rates for non-oven retorts which are around 1,000 scfm. Together, these differences can have a material impact on mercury concentration, mass flow rate of mercury, and other factors that influence mercury loadings to the recovery/control system. After evaluation of these technical and operational differences between oven retorts and non-oven retorts and their potential effect on emissions characteristics and control device applicability, we are proposing to distinguish between retort types for the purpose of establishing MACT.

With the exception of the plant with a single hearth retort that is controlled with a scrubber as the final control device, the recovery/control system at each plant consists of condensation and carbon adsorption for final mercury control. The amount and type of carbon adsorbent used in the fixed bed, nonregenerative carbon adsorbers

varies among the five plants. One plant uses activated carbon, one uses iodine-impregnated carbon, and three use sulfur-impregnated carbon. We believe that each type is effective in removing mercury provided the adsorbent is replaced at a frequency appropriate to prevent breakthrough.

In contrast, the plant with the single hearth retort utilizes a chlorinated brine packed-tower scrubber for final mercury control. In this scrubber, elemental mercury vapor is removed by chemically reacting with the chlorinated brine solution to form mercuric chloride, a nonvolatile mercury salt which is readily soluble in aqueous solutions. The resulting scrubber effluent is returned to the brine system causing the absorbed mercury to be recycled back to the mercury cells. Performance data for this brine scrubber system shows that the effectiveness is comparable to that of the condenser/carbon adsorber systems used at the other five plants.

While examining the performance capabilities of the condenser/carbon adsorber systems, we identified several factors that influence performance. We believe that a primary factor affecting mercury recovery and control is the temperature to which retort off-gas is cooled prior

to entering the final control device. Because of the volatile nature of elemental mercury, temperature has a direct effect on the concentration of mercury vapor that can exist in a gas stream. For example, the concentration of mercury vapor that could exist in a gas stream at 50°F is 5 mg/m³, while the predicted concentration at 85°F is 30 mg/m³, a six-fold increase. At 100°F, the concentration could potentially be over 50 mg/m³.

A key factor relative to the performance of carbon adsorbers is contact time. As noted previously, we believe that generally each of the carbon adsorbents presently used in the industry can effectively collect mercury vapor. However, it is essential for optimum performance that the contact time between the gas stream to be treated and the carbon adsorbent be long enough to allow for maximum adsorption. Consequently, design and operational factors such as carbon bed depth, sorbent particle size, and gas velocity have an appreciable impact on collection efficiency. Another key consideration is the frequency at which the adsorbent is replaced since the adsorbing capacity of any sorbent decreases as saturation and breakthrough are approached.

In assessing potential formats for a numerical emission limit, we considered a limit on emissions in a specified time period, a limit normalized on the amount of wastes processed, and an outlet mercury concentration limit. The amounts and types of wastes processed at each plant and among plants vary considerably. We believe, generally, that mercury emissions from the thermal recovery unit vent are proportional to the amount of mercury-containing wastes processed and the amount of mercury contained in these wastes. Therefore, we concluded that limiting emissions over a specified time period would unfairly impact plants that process larger amounts of wastes and/or wastes that contain more mercury. A mercury emission limit normalized on the amount of wastes processed would eliminate this inequity. However, given the wide variation in the mercury content of different types of wastes and the varying mix of waste types processed at different plants, we concluded that setting and enforcing such an emissions limit is impractical.

Several factors influence the concentration of mercury in the thermal recovery unit vent exhaust. The most significant include the mercury content of the wastes being processed and the volumetric flow rate

through the system. Volumetric flow rate is dependent on process rate, fuel usage, and the volume of combustion gas generated. The mercury concentration may also vary depending on the stage of the heating cycle. The mercury content of the exhaust stream leaving the condenser(s) or other type of cooling unit should remain relatively constant, provided that the outlet temperature is constant and the residence time is sufficient. Depending on the effectiveness of the carbon adsorber or brine scrubber, the mercury concentration would be further reduced. As a result, we conclude that concentration at the outlet of the final control device is the most meaningful and practical measure of the combined performance of each element of the mercury recovery/control system. Therefore, we have selected concentration for the format of the MACT standard for mercury thermal recovery units.

Finally, we evaluated how, or if, the proposed standards should address different waste types; that is, should different emission limits be set for different waste types or should one limit be set for the waste type shown to be the highest emitting. We analyzed all the available data but were unable to ascertain any relationship between the type of waste (K106, D009

debris, or D009 nondebris) being treated during testing or sampling and the outlet mercury concentration measured across all plants. As a result, we are proposing an outlet mercury concentration limit that is neutral to the type of waste being processed. The analysis also influenced our decision on the proposed requirements for performance testing. We are proposing that testing be conducted during conditions representative of the most extreme, relative to potential mercury concentration, expected to occur under normal operation. While we would have preferred that the proposed rule specify the type of waste to be processed during testing, our inability to discern a relationship between waste type and outlet mercury concentration across plants prevented us from doing so. Therefore, the proposed rule would obligate owners and operators to process mercury-containing wastes that result in the highest vent mercury concentration during performance testing.

In summary, our review and analysis of all the available information on mercury thermal recovery units leads us to the following conclusions:

- ! Separate MACT emission limits should be developed for oven type and non-oven (rotary kiln and single hearth) type mercury thermal recovery units.

! These emission limits should not distinguish among waste types processed.

! Concentration is the appropriate format for the numerical emission limits.

The following describes how we selected the proposed emission limits for oven type and non-oven type mercury thermal recovery units.

There are three plants that use oven retorts. All are owned and operated by the same company. One plant operates five ovens, another operates three ovens, and the third operates two ovens. Thermal recovery at all three plants is conducted between 6,000 to 7,000 hours per year. The amounts of waste processed and the amounts of mercury recovered range from 90 to almost 300 tpy and from 3 to 20 tpy, respectively. At all three plants, the mercury-laden off-gas leaving the retort is cooled and treated for particulates and acid gases in a wet scrubber with caustic solution, followed by further cooling in a condenser. The cooled gas is then routed through one or more fixed-bed, nonregenerative carbon adsorbers before being discharged to the atmosphere. We conducted an evaluation of the mercury recovery/control systems at all three plants, considering the condenser outlet temperature and the amount of carbon in the beds.

The plant that ranked highest in this evaluation, which we consider to be the best-controlled plant, provided mercury emissions data (periodic sampling results) over 3 years. The other two plants were unable to provide emissions data. Therefore, data from this best-controlled plant were used to establish MACT. Since an emission limit based on the best-controlled plant would obviously be more stringent than the floor level, the selection of a level associated with the best-performing recovery/control system for this retort type clearly meets our statutory requirement regarding the minimum level allowed for NESHAP.

This best-controlled plant has five ovens and two separate but identical mercury recovery/control systems. One treats the exhaust gas from three ovens while the other services two ovens. Each system is comprised of a wet scrubber and condenser, which cool the exhaust gases to around 70°F, followed by a carbon adsorber with about 700 pounds of activated carbon. Available test data for this plant consist of bimonthly measurements for 1997, 1998, and 1999 on each stack. We reviewed the sampling method used to obtain these data which are largely based on EPA reference methods for mercury emissions from mercury cell chlor-alkali plants and concluded that it is

capable of producing measurements of reasonable accuracy that are suitable for use as the basis for MACT. We removed six data points that we determined were statistical outliers and combined the data for both control systems into one data set comprised of 134 individual measurements.

We then evaluated options for how these data should be used to establish a numerical emission limit to represent MACT. While this limit must represent the performance of the controls in place at this best-controlled plant, it also must account for variability in outlet mercury concentration due to processing different mercury-containing waste types and normal variation in recovery/control equipment performance. As noted previously, we are proposing that performance tests for mercury thermal recovery units be conducted under the most challenging conditions, which we are defining as the processing of wastes that result in the highest recurring mercury concentration in the vent exhaust. Each performance test would consist of at least three runs, and the average concentration measured would be compared with the emission limit to determine compliance. Given our inability to establish a discernible correlation between waste type processed and emissions, our

obligation to set standards that are achievable under the full range of normal acceptable operating conditions and the fact that initial performance is based on at least three separate test runs, we chose to set the standard based on the average of the three highest measured values in the data set of 134 measurements for the best-controlled plant. The three measured values are 20.4, 22.1, and 26.4 mg/m³. The average of the three is 23 mg/dscm, which we are proposing as the mercury concentration emission limit for oven type units.

Due to the very low volumetric flow rates associated with oven type mercury thermal recovery unit exhaust streams (typically less than 300 scfm), we believe that the retrofit of control equipment to reduce mercury emissions is both practical and reasonable. For purposes of estimating the impacts of the proposed emission limit, we assumed that the two plants with lower-performing control systems would need to install new, larger carbon adsorbers to meet the 23 mg/dscm level. The total installed capital control costs are estimated to be around \$217,000 for all three plants, and the total annual control costs are estimated to be around \$163,000 per year for all three plants. Estimated mercury emission reductions against actual baseline emissions

would total 33 kg/yr (74 lbs/yr) for all three plants. The associated annual cost per unit of mercury emission reduction would be approximately \$2,200 per pound.

Impacts on solid waste due to increased use of carbon adsorption are estimated total 5.2 Mg/yr (5.7 tpy) of mercury-containing spent carbon. Energy requirements are estimated to be an additional 473 thousand kW-hr/yr. Estimated secondary air pollution impacts due to heightened energy consumption are 152 Mg/yr (168 tpy), with carbon dioxide emissions comprising 99 percent of the estimate.

As noted previously, three plants operate retorts other than oven-type retorts. Thermal recovery at these three plants is conducted between 1,500 and 5,000 hours per year. The amounts of waste processed and the amounts of mercury recovered range from 50 to 500 tpy and from 3 to 12 tpy, respectively. The mercury recovery/control systems operated at the two plants with rotary kiln retorts consist of direct contact cooling, particulate and acid gas scrubbing, condensation, and carbon adsorption. The retort off-gas at both plants is cooled to a temperature of 55°F on average before being routed through two fixed-bed, nonregenerative adsorbers containing sulfur-impregnated carbon media. The mercury

recovery/control system at the plant with a single hearth retort employs a direct contact water quench tower, a venturi scrubber, and a caustic packed-tower scrubber, which lower the retort off-gas temperature to an average of 80°F, and a chlorinated brine packed-tower scrubber as the final control device. The following summarizes the emissions data available and our approach to determining MACT for non-oven type units.

At one of the plants with a rotary kiln, the mercury concentration is determined daily at the outlet of the last carbon adsorber bed using a company-developed procedure derived from an OSHA method for determining worker exposures in the workplace. When submitting data obtained using this method, the company cautioned that although the routine sampling with the modified OSHA procedure produces credible information on relative changes in performance, it does not produce accurate information on actual mercury releases. Specifically, we believe the data obtained using this method are biased low. The average measured mercury concentration for this plant is an order of magnitude lower than averages for the other two plants (discussed below), and the minimum measured value is two orders of magnitude lower. It is our conclusion that data from this plant are unsuitable

for standard setting, as they greatly understate emissions and thus overstate the performance of the mercury recovery/control system.

At the other plant with a rotary kiln, concentration measurements are made monthly using a method that is a modification of EPA Method 101 for determining mercury emissions from mercury cell chlor-alkali plants. Data were provided for each month in 1998. The measured mercury concentrations range from 1.4 mg/m³ to 6.0 mg/m³, with a mean of 2.8 mg/m³.

Personnel at the plant with the single hearth retort conduct monthly measurements of the mercury concentration in the brine scrubber exhaust gas. The measurement method used is based on an EPA reference method and is very similar to the method used at the second rotary kiln plant discussed above. Data were provided for 1997, 1998, and 1999. The measured mercury concentrations range from 0.2 mg/m³ to 10.8 mg/m³, with a mean and median value of 1.6 and 2.2 mg/m³, respectively.

In establishing the MACT floor and subsequently MACT, we focused on the two plants for which we have credible emissions data. We removed two points determined to be statistical outliers from the 3-year data set at the plant with the single hearth retort and

determined there were no statistical outliers in the 1998 data set for the second plant with a rotary kiln. These data were used in the MACT determination for non-oven thermal recovery unit vents.

Although there are fewer than five sources from which to constitute a MACT floor, we opted to take the mean of the data from these two plants as the MACT floor option for existing sources. We averaged the three highest concentration data points for each plant and took the mean of the two plant averages (3.9 mg/dscm and 5.4 mg/dscm) rounded to one significant figure, 5 mg/dscm, as the floor value.

Of the three plants with non-oven type mercury thermal recovery unit vents, we project that only one plant would need to upgrade existing controls to meet the 5 mg/dscm floor level, and that this could be accomplished by replacing the carbon in its existing carbon adsorbers more frequently than current practice. There would be no capital costs as more frequent carbon media replacement is only a recurring annual cost estimated at \$1,200 per year. Mercury emission reductions against actual baseline emissions would total about 2 kg/yr (5 lbs/yr) for the three plants. The associated annual cost per unit of mercury emission

reduction would be approximately \$240 per pound. With the assumption of more frequent carbon media replacement, there are no associated secondary air pollution, water pollution, or energy impacts. Estimated solid waste impacts due to increased use of carbon adsorption total 0.09 Mg/yr (0.1 tpy).

We then examined beyond-the-floor MACT options. A direct comparison of the data for the two plants providing credible data indicates that the emission levels recorded at one plant (with mean and median values of 1.2 and 0.7 mg/m³, respectively) are about half that recorded at the other plant (with mean and median values of 2.8 and 1.9 mg/m³, respectively). Further, the highest monthly values recorded were 4.3 mg/m³ and 5.9 mg/m³, respectively. We used the data from the lower-emitting plant to establish a beyond-the-floor option. We averaged the three highest values for this plant (not including the values determined to be outliers) for a beyond-the-floor value of 4 mg/dscm.

Due to the very low volumetric flow rates associated with non-oven type mercury thermal recovery unit exhaust streams (typically less than about 2,000 scfm), we believe that the retrofit of control equipment to reduce mercury emissions is both practical and reasonable. For

purposes of estimating impacts, we assumed that one plant would need to upgrade its controls, and that it would do this by further increasing its carbon replacement frequency to meet the 4 mg/dscm level. We assume that the remaining plant would not need to upgrade its existing controls to meet the beyond-the-floor level.

In evaluating regulatory options that are more stringent than the floor, we must consider the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements. The beyond-the-floor option would result in an additional 6 kg/yr (13 lbs/yr) of total mercury emission reductions for the three plants (a 10 percent incremental reduction from the floor option). The incremental annual costs are estimated to total around \$5,800 per year. The incremental cost per unit of incremental mercury emission reduction is approximately \$450 per pound. With the assumption of more frequent carbon media replacement, there are no associated incremental secondary air pollution, water pollution, or energy impacts. The estimated solid waste impacts total an additional 0.4 Mg/yr (0.5 tpy) of mercury-containing spent carbon.

We believe the additional emission reductions that would be achieved by the beyond-the-floor option are warranted. Further, we believe that the incremental costs of achieving such emission reductions, as well as incremental non-air environmental impacts and energy requirements, are reasonable for mercury. Therefore, we selected 4 mg/dscm as MACT for non-oven type mercury thermal recovery unit vents.

In summary, the proposed emission limits are 23 mg/dscm and 4 mg/dscm for oven type mercury thermal recovery unit vents and non-oven type mercury thermal recovery unit vents, respectively. We believe that both proposed limits are representative of the best-performing systems for each retort type based on available data and as such, each limit clearly meets our statutory safeguard regarding the minimum level of control allowed under the statute.

E. How did we determine the basis and level of the proposed standards for new sources?

Section 112(d)(3) of the CAA specifies that standards for new sources cannot be less stringent than the emission control that is achieved in practice by the best-controlled similar source, as determined by the Administrator.

In the case of mercury cell chlor-alkali production facilities, of the 43 chlor-alkali production facilities in operation in the U.S. at the time of this analysis, 32 use cell technologies other than mercury (23 use diaphragm cells and 9 use membrane cells). As explained further below, we consider these chlor-alkali facilities using non-mercury cell technology to be "similar sources," and, as such, a suitable basis for the standard for new source MACT. Such a standard would effectively eliminate mercury emissions from new source chlor-alkali production facilities.

The impact of such a standard would be negligible given that in terms of cost, economic and air and non-air environmental impacts, we don't believe that a new mercury cell chlor-alkali plant would otherwise ever be constructed. No new mercury cell chlor-alkali plant has been constructed in the U.S. in over 30 years, and we have no indication of any plans for future construction. In addition, we believe that any future demand for new or replacement chlor-alkali production capacity would be met easily through the construction of new production facilities that do not use or emit mercury. Consequently, we believe it is appropriate to consider non-mercury cell facilities as similar sources and the

prohibition of new mercury cell chlor-alkali production facilities achievable. Accordingly, we are proposing a complete prohibition on mercury emissions for new source MACT for mercury cell chlor-alkali production facilities. We are not proposing any initial and continuous compliance requirements related to this emission limit as we believe they are unnecessary since the emissions prohibition effectively precludes the new construction or reconstruction of a mercury cell chlor-alkali production facility.

As highlighted in the previous discussion on the selection of standards for existing sources, the emission levels achieved by the best-controlled sources were selected as the proposed existing source MACT levels for mercury recovery facilities. These best levels of control for point sources are 23 mg/dscm of exhaust from an oven type mercury thermal recovery unit vent, and 4 mg/dscm of exhaust from a non-oven type mercury thermal recovery unit vent. For fugitive emission sources, the best level of control identified is the work practice standard represented in the beyond-the-floor option selected for proposal for existing sources.

In the case of mercury recovery facilities, we know of three plants that employ low emitting mercury recovery

processes. These processes include chemical mercury recovery used at two plants and recovery in a batch purification still used at a third plant. Unlike thermal recovery units which are capable of treating a variety of waste types, the chemical recovery and the purification still processes have limited application. Both are suitable to treating only certain waste types, K106 wastes for the former and end-box residues for the latter. Plants using these nonthermal recovery processes transfer their remaining wastes off-site for treatment, which typically involves thermal recovery. Given this limitation, we do not believe that these nonthermal recovery processes qualify as a suitable basis for new source MACT. Consequently, for new source MACT for mercury recovery facilities, we are proposing numerical mercury emission limits consistent with that achieved by the best similar sources, 23 mg/dscm for oven type thermal recovery unit vent and 4 mg/dscm for non-oven type thermal recovery units.

F. How did we select the testing and initial compliance requirements?

We selected the proposed testing and initial and continuous compliance requirements based on requirements specified in the NESHAP General Provisions (40 CFR

part 63, subpart A). These requirements were adopted for mercury cell chlor-alkali plants to be consistent with other part 63 NESHAP. These requirements were chosen to ensure that we obtain or have access to sufficient information to determine whether an affected source is complying with the standards specified in the proposed rule.

The proposed rule would require initial and periodic compliance tests for determining compliance with the emission limits for by-product hydrogen streams and end-box ventilation system vents, and the emission limits for oven type and non-oven type mercury thermal recovery unit vents. The proposed rule would require the use of published EPA methods for measuring total mercury. Specifically, the proposed rule would allow the use of Method 101 or 101A (of appendix A of 40 CFR part 61) for end-box ventilation system vents and mercury thermal recovery unit vents and Method 102 for by-product hydrogen streams. Methods 101 and 102 were developed in the 1970's specifically for use at mercury cell chlor-alkali plants. Although Method 101A was developed to measure mercury emissions from sewage sludge incinerators, it is appropriate for use for end-box

ventilation system vents and mercury thermal recovery unit vents.

The NESHAP General Provisions specify at §63.7(e)(3) that each test consist of three separate test runs. The proposed rule would adopt this requirement. Further, the proposed rule would require that each test run be at least 2 hours long. This is the duration specified in Method 101 and referenced in Methods 101A and 102.

In the stack test data that were provided to us, there were numerous incidents where the results were reported as "less than" a certain level. We believe that this is primarily related to the sensitivity of the analytical instrument (that is, the absorption spectrophotometer) used to measure the amount of mercury in the collected sample. Method 101 states that the absorption spectrometer must be the "Perkin Elmer 303, or equivalent, containing a hollow-cathode mercury lamp and the optical cell" It is our understanding that this particular model is no longer commercially available, and that newer, more sensitive absorption spectrophotometers are available. We considered whether it was necessary to specify, either in the proposed rule or through a modification to the test method, that Perkin Elmer 303 did not have to be used. We concluded that the

"or equivalent" language contained in Method 101 allows for the use of newer, more sensitive instruments and as a result, adding rule language or amending Method 101 was unnecessary.

Even with the 2-hour minimum test run period and the clarification that newer, more sensitive absorption spectrophotometers are allowed to be used, we remain concerned that quantifiable results of mercury emissions may not be obtained during performance tests. As a result, the proposed rule includes a requirement that the amount of mercury collected during each test run be at least 2 times the limit of detection for the analytical method used. This will assure that a reliably quantifiable amount of mercury is collected for each test run.

The emission limits for by-product hydrogen streams and end-box ventilation system vents are in the form of mass of mercury emissions per mass of chlorine produced. Therefore, criteria for the measurement of chlorine production during performance testing are also necessary. It is our understanding that instrumentation used to measure actual chlorine production, as well as the location and frequency of measurement, varies from plant to plant. Types of instruments used include rail car

weigh scales, weigh cells on liquid storage tanks, and gas flow meters. Calibration procedures for these instruments are plant-specific and dependent on the involvement of third parties concerned with quantifying actual chlorine production for billing and other purposes. Moreover, at a given plant, an accurate value for actual chlorine production based on these measurements is generally obtained at the end of an operating month when mass balance calculations are performed to verify measurements.

For a compliance test run on the order of several hours, we, therefore, needed to rely on some other reasonable indicator of chlorine production. All mercury cell chlor-alkali plants measure the electric current through on-line mercury cells, also known as the cell line load or cell line current load, with a digital monitor that provides readings continuously. This cell line current load measurement can be used in conjunction with a theoretical chlorine production rate factor to obtain the instantaneous chlorine production rate. The theoretical factor is based on a statement of Faraday's Law that 96,487 Coulombs (Faraday's constant, where a Coulomb is a fundamental unit of electrical charge) are required to produce one gram equivalent weight of the

electrochemical reaction product (chlorine). It is our understanding that chlorine production calculated in this manner would differ from the actual quantity produced at the plant by about 3 to 7 percent due to electrical conversion efficiency and reaction efficiency determined by equipment characteristics and operating conditions. We consider this degree of variability acceptable.

We, therefore, stipulate in the proposed rule that the cell line current load be continuously measured during a performance test run and that measurements be recorded at least every 15 minutes over the duration of the test run. We further specify equations for computing the average cell line current load and for calculating the quantity of chlorine produced over the test run.

In addition to the requirement to conduct performance tests to demonstrate compliance with the emission limits, owners or operators would be required to establish a mercury concentration operating limit for each vent as part of the initial compliance demonstration. Then, at least twice a permit term (at mid-term and renewal), they would conduct subsequent compliance demonstrations and at the same time reestablish operating limit values. The proposed rule would require that these mercury concentration operating

limits be determined directly from the concentration monitoring data collected concurrent with the initial performance test.

For the work practice standards, initial compliance is demonstrated by documenting and certifying that the standards are being met or will be met by submitting a washdown plan and by certifying that the plan is being followed or will be followed. This approach assures initial compliance by requiring the owner or operator to submit a certified statement in the Notification of Compliance Status report.

G. How did we select the continuous compliance requirements?

For each of the proposed emission limits, which consist of the limits on mercury emissions from hydrogen streams, end-box ventilation systems, and thermal recovery units, we considered the feasibility and suitability of continuous emission monitors (CEM) as the means of demonstrating continuous compliance. While we were unable to identify any mercury cell chlor-alkali plant currently using a mercury CEM on any vent, we did determine that there are mercury CEM commercially available that may be suitable for use at mercury cell chlor-alkali plants. To date, most of the development

work on mercury CEM has focused on the development of monitors for the continuous measurement of mercury air emissions from either coal-fired utility boilers or hazardous waste incinerators. Most mercury CEM are extractive monitors which extract a continuous or nearly continuous sample of gas, then transfer the gas to an instrument for spectroscopic analysis by way of either cold vapor atomic absorption or cold vapor atomic fluorescence.

These cold vapor techniques have similar limitations. Both detect mercury vapor only in its elemental form. To measure other forms of mercury vapor (e.g., oxidized/inorganic/divalent mercury, such as mercuric chloride), the sampled gases must first pass through a converter which reduces any nonelemental mercury vapor present to the elemental form prior to analysis. None of the available monitors based on the cold vapor techniques are capable of measuring particulate or nonvapor phase mercury since the sample gas must be filtered to remove any particulate matter present prior to conversion and analysis. This would include elemental mercury condensed on particulate matter and any mercury compounds in particulate form. Monitors that are capable of measuring total vapor phase mercury

range in price from \$50,000 to \$80,000. Simpler monitors that measure only elemental mercury vapor average about \$10,000.

For the proposed emission limits for by-product hydrogen streams and end-box ventilation system vents, which are expressed in grams of mercury per megagram of chlorine produced, we evaluated two options: continuous compliance against the proposed gram per megagram standards, and continuous compliance against plant and vent specific operating limits expressed in terms of concentration. In addition to monitoring mercury concentration, the first option would require continuous monitoring of volumetric flow rate and a continuous, or at least periodic, measurement of chlorine production. The operating limits for the second option would be set at the time that initial compliance with the emission limit is demonstrated.

Since the predominant form of liquid mercury in mercury cells and other production facilities is elemental, we assumed that the mercury contained in the vent gas from either by-product hydrogen streams or end-box ventilation system vents is similarly largely in the elemental vapor form. Thus, the simpler, less expensive

monitors for measuring elemental mercury vapor only should be suitable.

We concluded that monitoring only elemental mercury concentration provides a simpler, less expensive, and more reliable alternative to demonstrating continuous compliance than monitoring against the gram per megagram standards. As a result, we are proposing that continuous compliance for by-product hydrogen streams and end-box ventilation system vents be demonstrated through the continuous monitoring of elemental mercury concentration in the vent exhaust.

To the best of our knowledge, mercury contained in the exhaust gas of thermal recovery units, both oven and non-oven types, should exist as both vapor (elemental or nonelemental) and fine particulate matter. As highlighted above, none of the currently available monitors are capable of measuring particulate mercury. Consequently, continuous monitoring to demonstrate continuous compliance with the total mercury concentration limit would not be possible.

Similar to the by-product hydrogen streams and end-box ventilation system vents, we also considered the feasibility and usefulness of monitoring vapor phase mercury, specifically the elemental form. We concluded

that the continuous monitoring of elemental mercury vapor as a surrogate to the total mercury emission limit using the simpler of the available monitors provides an acceptable and cost-effective means of tracking relative changes in emissions and control device performance. Therefore, as proposed for by-product hydrogen streams and end-box ventilation system vents, we are proposing for oven type and non-oven type mercury thermal recovery units that continuous compliance be demonstrated through continuous monitoring of elemental mercury concentration against an applicable concentration operating limit established as part of the initial compliance demonstration.

Another important aspect of continuous compliance is the time period over which continuous compliance is determined. One option would be an instantaneous period, where any measurement outside of the established range (that is, above the established concentration limit) would constitute a deviation. More commonly, the average of the monitoring data over a specified time period, for example an hour, is compared to the established limit.

While mercury cell chlor-alkali production facilities are generally operated continuously, there are process fluctuations that impact emissions. Mercury

recovery facilities are operated intermittently, depending on the amount of mercury-containing waste to be treated and other factors. We believe that an emissions averaging period is necessary for both situations. We considered a daily averaging period and concluded that daily averaging would accommodate process variations while precluding avoidable periods of high emissions. Therefore, we are proposing a daily averaging period for demonstrating continuous compliance.

We also considered how to address monitoring data collected during startups, shutdowns, and malfunctions. We believe that it is important to continue to monitor the outlet mercury concentration during startups, shutdowns, and malfunctions to minimize emissions and to demonstrate that the plant's startup, shutdown, and malfunction plan is being followed. However, as provided for in the NESHAP General Provisions (40 CFR part 63, subpart A), we do not believe that the data collected during these periods should be used in calculating the daily average values. The emission limits were developed based on normal operation, and the performance tests will be conducted during representative operating conditions. Therefore, the inclusion of monitoring data collected during startups, shutdowns, and malfunctions into the

daily averages would be inconsistent with the data used to develop the emission limits and, subsequently, the mercury concentration operating limits.

While we did not identify situations in the mercury cell chlor-alkali industry where elemental mercury concentration is being continuously monitored, we believe that continuous elemental mercury concentration monitoring devices are available for use at mercury cell chlor-alkali plants. We recognize that the transfer of this monitoring technology to applications at mercury cell chlor-alkali plants will introduce uncertainties that can only be addressed through actual field demonstration. We are specifically requesting comment on the technical feasibility of using continuous elemental mercury concentration monitors for indicating relative changes in control system performance. We are also requesting comment on the proposed specifications for these devices.

Continuous compliance with the proposed work practice standards for the fugitive emission sources would be demonstrated by maintaining the required records documenting conformance with the standards and by maintaining the required records showing that the washdown plan was followed.

H. How did we select the notification, recordkeeping, and reporting requirements?

We selected the proposed notification, recordkeeping, and reporting requirements based on requirements specified in the NESHAP General Provisions (40 CFR part 63, subpart A). As with the proposed initial and continuous compliance requirements, these requirements were adapted for mercury cell chlor-alkali plants to be consistent with other part 63 national emission standards.

IV. Summary of Environmental, Energy, Cost, and Economic Impacts

A. What are the air emission impacts?

As discussed previously, the level of mercury emissions allowed by the Mercury NESHAP is 2,300 grams per day. If one assumes that all twelve plants in the source category emit mercury at this level and that each operates 365 days a year, total annual potential-to-emit baseline emissions would be 10,074 kg/yr (22,200 lb/yr). Annual potential-to-emit baseline emissions for fugitive emission sources would be 5,694 kg/yr (12,544 lb/yr), based on 1,300 grams per day assumed for each plant's cell room ventilation system when the eighteen design, maintenance, and housekeeping practices referenced in the

Mercury NESHAP are followed. Annual potential-to-emit baseline emissions for by-product hydrogen streams, end-box ventilation system vents, and mercury thermal recovery unit vents would be 4,380 kg/yr (9,656 lb/yr), based on the remaining 1,000 grams per day allowed. We estimate that the proposed rule would reduce industrywide mercury emissions for by-product hydrogen streams, end-box ventilation system vents, and mercury thermal recovery unit vents from this annual potential-to-emit baseline to around 245 kg/yr (545 lb/yr), which is equivalent to about 94 percent reduction.

While the level of mercury emissions allowed by the Mercury NESHAP defines the potential-to-emit baseline, the sum of annual mercury emissions releases from by-product hydrogen streams, end-box ventilation system vents, and mercury thermal recovery vents, as estimated by mercury cell chlor-alkali plants, defines an annual actual baseline for vents of about 935 kg/yr (2,060 lb/yr). We estimate that the proposed rule would reduce industrywide mercury emissions for vents from this annual actual baseline to around 245 kg/yr (545 lb/yr), which is equivalent to about 74 percent reduction.

We estimate that secondary air pollution emissions would result from the production of electricity required

to operate new control devices and new monitoring equipment assumed for plant vents. Assuming electricity production as based entirely on coal combustion for a worst-case scenario, we estimated plant-specific impacts for carbon dioxide, sulfur dioxide, nitrogen oxides, particulate matter, and carbon monoxide emissions. The total estimated secondary air impacts of the proposed requirements for point sources at the twelve mercury cell chlor-alkali plants is around 554 Mg/yr (611 tpy) for all pollutants combined, with carbon dioxide emissions comprising 99 percent of the estimate.

We are unable to quantify the primary air emission impacts associated with the proposed work practice standards, so no mercury emission reduction is assumed for fugitive emission sources. However, we believe strongly that the new and more explicit requirements contained in the proposed standards will in fact result in mercury emission reductions beyond baseline levels. Relative to secondary impacts, we expect that secondary air pollution emissions, principally carbon dioxide, would result from the production of electricity required to operate new monitoring equipment assumed for plant cell rooms. We estimate the secondary air impacts of the

proposed rule for fugitive sources to be 17 Mg/yr (19 tpy).

B. What are the non-air health, environmental, and energy impacts?

We do not expect that there will be any significant adverse non-air health impacts associated with the proposed standards for mercury-cell chlor-alkali plants.

We estimate that an increase in the amount of mercury-containing waters would result from the heightened use of packed tower scrubbing assumed for several plant vents. The total estimated water pollution impact of the proposed rule for point sources is about 1.8 million liters (466 thousand gallons) of additional wastewater per year. We estimate that an increase in the amount of mercury-containing solid wastes would result with the heightened use of carbon adsorption assumed for several plant vents. The total estimated solid waste impact of the proposed rule for point sources is about 34 Mg/yr (38 tpy) of additional mercury-containing spent carbon.

We are unable to quantify non-air environmental impacts associated with the proposed work practice standards, so no wastewater and solid waste impacts are assumed for fugitive emission sources.

We estimate that the proposed requirements for point sources would result in increased energy consumption, specifically additional fan power in conveying gas streams through new carbon adsorbers and new packed scrubbers assumed for certain plant vents and additional power consumed by new vent monitoring equipment. The total estimated energy impacts of the proposed requirements for point sources is about 1,724 thousand kW-hr/yr.

We estimate that the proposed requirements for fugitive sources would result in increased energy consumption required to operate new monitoring equipment assumed for plant cell rooms. The total estimated energy impacts of the proposed requirements for fugitive sources is about 53 thousand kW-hr/yr.

C. What are the cost and economic impacts?

For projecting cost impacts of the proposed rule on the mercury cell chlor-alkali industry, we estimate that all twelve plants would incur costs to meet the proposed work practice standards and the proposed monitoring, recordkeeping, and reporting requirements. We estimate that ten plants would incur costs to meet the proposed emission limits for by-product hydrogen streams and end-box ventilation system vents, and three plants would

incur costs to meet the proposed emission limits for mercury thermal recovery units. The total estimated capital cost of the proposed rule for the twelve mercury cell chlor-alkali plants is around \$2.5 million, and the total estimated annual cost is about \$2.2 million per year. Plant-specific annual costs in our estimate range from about \$91,000 for the least-impacted plant to about \$375,000 for the worst-impacted plant.

The purpose of the economic impact analysis is to estimate the market response of chlor-alkali production facilities to the proposed standards and to determine the economic effects that may result due to the proposed NESHAP. Chlor-alkali production jointly creates both chlorine and caustic, usually sodium hydroxide, in fixed proportions. Being joint commodities, the economic analysis considers the impacts of the proposed NESHAP on both the chlorine and sodium hydroxide markets.

The chlorine production source category contains 43 facilities, but only twelve facilities using mercury cells are directly affected by the proposed standards. These twelve facilities are located at twelve plants that are owned by eight companies. Although one of these twelve plants permanently closed due to reasons unrelated to this rulemaking, the following impacts are based on

the twelve plants in operation at the time the analysis was conducted.

Chlor-alkali production in mercury cells leads to potential mercury emissions from hydrogen streams, end-box ventilation system vents, mercury thermal recovery units, and fugitive emission sources. The compliance costs for the proposed standards, therefore, relate to the purchase, installation, operation, and maintenance of pollution control equipment at the point sources, as well as the labor costs and overheads associated with observing work practices addressing fugitive emissions. The estimated total annual costs for the proposed NESHAP are \$1.8 million. This cost estimate represents about 0.38 percent of the 1997 chlorine sales revenue for the twelve mercury cell chlor-alkali production facilities. Furthermore, the total annual costs represent only 0.01 percent of the revenues of owning the directly affected mercury cell chlor-alkali plants.

The economic analysis predicts minimal changes in industry outputs and the market prices of chlorine and sodium hydroxide as a result of the estimated control costs. The new market equilibrium quantities of chlorine and sodium hydroxide decrease by less than 0.1 percent. Equilibrium prices of chlorine and sodium hydroxide both

rise by less than 0.1 percent due to the proposed standards. Based on these estimates, we conclude that the proposed standards are not likely to have a significant economic impact on the chlorine production industry as a whole or on secondary markets such as the labor market and foreign trade.

We perform an economic analysis to determine facility- and company-specific impacts. These economic impacts are measured by calculating the ratio of the estimated annualized compliance costs of emissions control for each entity to its revenues (i.e., cost-to-sales ratio). After the cost-to-sales ratio is calculated for each entity, it is then multiplied by 100 to convert the ratio into percentages. Actual revenues at the facility level are not available, therefore, estimated facility revenues received from the sale of chlorine are used. Some of these facilities also produce caustic as potassium hydroxide, but the revenues from the sale of this product are not estimated. The twelve mercury cell chlor-alkali plants have positive cost-to-sales ratios. The ratio of costs to estimated chlorine sales revenue for these facilities range from a low of 0.16 percent to a high of 1.00 percent. The average cost-to-sales ratio for the twelve mercury process

chlorine production facilities is 0.46 percent. More detailed economic analysis predicted minimal changes in chlorine production at each facility. Thus, overall, the economic impact of the proposed standards is minimal for the facilities producing chlorine.

The share of compliance costs to company sales are calculated to determine company level impacts. Since eight companies own the twelve affected facilities, all eight firms face positive compliance costs from the proposed NESHAP. The ratio of costs to estimated revenues range from a low of less than 0.01 percent to a high of 0.22 percent, and the average ratio of costs to company revenues is 0.06 percent. Again, more detailed economic analysis at the company level predicts little change in company output or revenues. So, at the company level, the proposed standards are not anticipated to have a significant economic impact on companies that own and operate the chlorine production facilities.

No facility or company is expected to close as a result of the proposed standards, and the economic impacts to consumers are anticipated to be minimal. The generally small scale of the impacts suggests that there will also be no significant impacts on markets for the products made using chlorine or sodium hydroxide. For

more information, consult the economic impact analysis report entitled "Economic Impact Analysis for the Proposed Mercury Cell Chlor-Alkali Production NESHAP," which is available in the docket to this rulemaking.

V. Solicitation of Comments and Public Participation

We seek full public participation in arriving at final decisions and encourage comments on all aspects of the proposed standards from all interested parties. You need to submit appropriate supporting data and analyses with your comments to allow us to make the best use of them. Be sure to direct your comments to the Air and Radiation Docket and Information Center, Docket No. A-2000-32 (see **ADDRESSES**).

VI. Administrative Requirements

A. Executive Order 12866, Regulatory Planning and Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), the EPA must determine whether the regulatory action is "significant" and, therefore, subject to review by the Office of Management and Budget (OMB) and the requirements of the Executive Order. The Executive Order defines "significant regulatory action" as one that OMB determines is likely to result in a rule that may:

- (1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material

way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or Tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

Pursuant to the terms of Executive Order 12866, it has been determined that the proposed rule is not a "significant regulatory action" because none of the listed criteria apply to this action. Consequently, this action was not submitted to OMB for review under Executive Order 12866.

B. Executive Order 13132 (Federalism)

Executive Order 13132, entitled "Federalism" (64 FR 43255, August 10, 1999), requires the EPA to develop an accountable process to ensure "meaningful and timely input by State and local officials in the

development of regulatory policies that have federalism implications." "Policies that have federalism implications" is defined in the Executive Order to include rules that have "substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government." Under section 6 of Executive Order 13132, the EPA may not issue a rule that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, or the EPA consults with State and local officials early in the process of developing the rule. The EPA also may not issue a rule that has federalism implications and that preempts State law unless the Agency consults with State and local officials early in the process of developing the rule.

If the EPA complies by consulting, Executive Order 13132 requires the EPA to provide to OMB, in a separately identified section of the preamble to the rule, a federalism summary impact statement (FSIS). The FSIS must include a description of the extent of the

EPA's prior consultation with State and local officials, a summary of the nature of their concerns and the Agency's position supporting the need to issue the rule, and a statement of the extent to which the concerns of State and local officials have been met. Also, when the EPA transmits a draft final rule with federalism implications to OMB for review pursuant to Executive Order 12866, the EPA must include a certification from the Agency's Federalism Official stating that the EPA has met the requirements of Executive Order 13132 in a meaningful and timely manner.

The proposed rule will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. The proposed rule is mandated by statute and does not impose requirements on States; however, States will be required to implement the rule by incorporating the rule into permits and enforcing the rule upon delegation. States will collect permit fees that will be used to offset the resource burden of implementing the rule. Thus, the requirements of section 6 of the Executive Order do not apply to the

proposed rule. Although section 6 of Executive Order 13132 does not apply to the proposed rule, the EPA did consult with State and local officials in developing the proposed rule.

C. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments

Executive Order 13175, entitled "Consultation and Coordination with Indian Tribal Governments" (65 FR 67249, November 6, 2000), requires the EPA to develop an accountable process to ensure "meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications." "Policies that have tribal implications" is defined in the Executive Order to include regulations that have "substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and the Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes."

The proposed rule does not have tribal implications. It will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government

and Indian tribes, as specified in Executive Order 13175. Thus, Executive Order 13175 does not apply to the proposed rule.

In the spirit of Executive Order 13175 and consistent with EPA policy to promote communications between EPA and tribal governments, EPA specifically solicits additional comment on the proposed rule from tribal officials.

D. Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks

The Executive Order 13045 applies to any rule (1) that OMB determines is "economically significant," as defined under Executive Order 12866, and (2) the EPA determines that the environmental health or safety risk addressed by the rule has a disproportionate effect on children. If the regulatory action meets both criteria, the EPA must evaluate the environmental, health, or safety aspects relevant to children and explain why the rule is preferable to other potentially effective and reasonably feasible alternatives considered by the EPA.

As with most rulemakings developed under section 112(d) of the CAA, today's proposal is based on MACT. Risks to public health and impacts on the environment are not typically considered in the

development of emissions standards under section 112(d). Rather, these risks and impacts are considered later (within 8 years after promulgation of the MACT rule) under the residual risk program as required by section 112(f) of the CAA. While we do not believe the proposed rule to be "economically significant," as defined under Executive Order 12866, we do believe that it addresses environmental health or safety risks that may have a disproportionate effect on children.

Mercury has been identified as a priority pollutant under EPA's National Agenda to Protect Children's Health from Environmental Threats and by the Federal Children's Health Protection Advisory Committee (CHPAC). The CHPAC was formed to advise, consult with, and make recommendations to the EPA on issues associated with the development of regulations to address the prevention of adverse health effects to children. One of the CHPAC's primary missions was to identify five existing EPA regulations, which if reevaluated, could lead to better protection for children. The CHPAC recommended the Mercury NESHAP for chlor-alkali plants as one of the regulations to be reevaluated considering impacts on children. We adopted the CHPAC recommendation. Therefore, we have considered the impacts on children in

the development of the proposed rule. A qualitative assessment of the potential impacts on children's health due to mercury emissions from chlor-alkali plants is presented here.

1. What is mercury and how is it transported in the environment?

Mercury is a naturally occurring element found in air, water and soil. Mercury is found in various inorganic and organic forms in the environment. The three primary forms of interest for this assessment are: elemental mercury, inorganic or divalent mercury, and methylmercury. Based on available information, it appears that most of the mercury emitted from chlor-alkali plants is in the elemental form, and a small percentage is in the divalent form. The air transport and deposition patterns of mercury emissions depend on various factors including the chemical form of mercury emitted, stack height, characteristics of the area surrounding the site, topography, and meteorology. As it moves through environmental media (e.g., air, sediments, water), mercury undergoes complex transformations.

Mercury is highly toxic, persistent, and bioaccumulates in the food chain. The mercury emitted to the air from various types of sources (usually in

elemental or divalent forms) transports through the atmosphere and eventually deposits onto land or water bodies. The deposition can occur locally near the source or at long distances (e.g., hundreds or thousands of miles away). Once deposited, the chemical form of mercury can change (through a methylation process) into methylmercury (MeHg), which biomagnifies in the aquatic food chain. As reported in the 1997 EPA Mercury Study, nearly all of the mercury that accumulates in fish is MeHg. Generally, fish consumption dominates the pathway for human and wildlife exposure to mercury. As of July 2000, 40 States have issued fish advisories for mercury. Thirteen of these States have issued advisories for all water bodies in their State, and the other 27 States have issued advisories for over 1,900 specific water bodies.

2. What are the health effects of the various mercury compounds?

The health effects of the various mercury compounds were discussed earlier. Methylmercury is discussed further in this section because it is the primary form for which the general U.S. population is exposed.

Neurotoxicity is the health effect of greatest concern with MeHg exposure. The developing fetus is

considered most sensitive to the effects from MeHg.

Therefore, women of child-bearing age are the population of greatest concern. Some offspring born of women exposed to relatively high doses of MeHg during pregnancy exhibited a variety of developmental neurological abnormalities, including delayed onset of walking and talking, cerebral palsy, and reduced neurological test scores. Far lower in utero exposures have resulted in delays and deficits in learning abilities. It is also possible that children exposed after birth are also potentially more sensitive to the toxic effects of MeHg than adults because their nervous systems are still developing.

Extrapolating from high-dose exposure incidents, we derived a reference dose (RfD) for MeHg of 0.1 microgram per kilogram body weight per day (0.1 ug/kg/day) based on developmental neurological effects observed in children born to mothers who were exposed to MeHg during pregnancy. The RfD is an estimated daily ingestion level anticipated to be without adverse effect to persons, including sensitive subpopulations, over a lifetime. At the RfD or below, exposures are expected to be safe. The risks following exposures above the RfD are uncertain, but the potential for adverse health effects increases as exposures to MeHg

increase. The National Academy of Sciences (NAS), in its July 2000 report "Toxicological Effects of Methylmercury" (NAS, 2000), affirmed our assessment of MeHg toxicity and the level of our RfD.

3. What are the human exposures to MeHg and the potential health impacts?

The results of dietary surveys indicate that most of the U.S. population consumes fish and is exposed to some MeHg as a result. The typical fish consumer (who eats moderate amounts of fish from restaurants and grocery stores) in the U.S. is not likely to be at risk of consuming harmful levels of MeHg; however, people who eat more fish than is typical or eat fish that are more contaminated than typical fish may be at risk. Furthermore, certain groups, such as pregnant women and their fetuses, young children, and subsistence fish-eating populations may be at particular risk.

Based on an exposure assessment presented in the 1997 EPA Mercury Study, we estimate that about 7 percent of women of childbearing age (i.e., between the ages of 15 and 44 years) in the U.S. are exposed to MeHg at levels exceeding the RfD, and about 1 percent of women have MeHg exposures 3 to 4 times this level. Moreover, the NAS estimated in their recent report that over

60,000 children born each year in the U.S. are at risk for adverse neurological effects due to in utero exposure to MeHg (NAS, 2000). These exposure estimates are also supported by a recent study by the U.S. Center's for Disease Control and Prevention (CDC) on mercury levels in women of childbearing age as measured in hair and blood. The results of that study (which were published in the CDC's Morbidity and Mortality Weekly Report on March 2, 2001) show that about 10 percent of women of childbearing age in the U.S. are exposed to mercury at levels above the EPA's RfD.

Methylmercury exposure rates on a per body weight basis among children are predicted to be higher than for adults. The EPA estimates that about 25 percent of children are exposed to MeHg through consumption of fish at levels exceeding the RfD, and 5 percent of children have MeHg exposures 2 to 3 times this level (EPA, 1997).

Most of the mercury currently entering U.S. water bodies and contaminating fish is the result of air emissions which, following atmospheric transport, deposit onto watersheds or directly to water bodies. We have concluded that there is a plausible link between emissions of mercury from anthropogenic sources (including chlor-alkali plants) and MeHg in fish. Waste

water discharges also contribute to environmental loadings, but to a much lesser degree than air emissions. Based on modeling conducted for the 1997 EPA Mercury Study, we estimate that roughly 60 percent of the total mercury deposited in the U.S. comes from U.S. anthropogenic air emission sources; this percentage is estimated to be even higher in certain regions (e.g., Northeast U.S.). The remainder of the deposited mercury comes from natural emission sources, re-emissions of historic global anthropogenic mercury releases, and from current anthropogenic sources outside the U.S.

We predict that increased mercury deposition will lead to increased levels of MeHg in fish, and that increased levels in fish will lead to toxicity in fish-eating birds and mammals, including humans. The NAS, in its July 2000 report, stated that "because of the beneficial effects of fish consumption, the long-term goal needs to be a reduction in the concentrations of methylmercury in fish." We agree with this goal and believe that reducing emissions of mercury from various anthropogenic sources is an important step toward achieving this goal.

4. What is the effect of mercury emissions from chlor-alkali plants?

The majority of the mercury emitted from chlor-alkali plants is in the elemental form, with a much smaller percent in the divalent form. As stated above, fish consumption generally dominates the pathway for human and wildlife exposure to mercury. However, for people living close to chlor-alkali plants, other exposure pathways may be significant. Appreciable exposures to elemental mercury and divalent mercury may occur through inhalation. Likewise, exposures to divalent mercury and MeHg may occur through ingestion of contaminated soils or plants. Based on modeling conducted for the 1997 EPA Mercury Study, we estimate that mercury levels in multiple environmental media (air, soil, water, plants, and fish) near a typical chlor-alkali plant could be elevated above background levels. We also estimate that exposures for people living near these facilities could be higher than for people living further away. The extent of exposures for people living near these plants will depend on various factors, including local terrain and meteorology, personal life style, activity patterns, and consumption patterns.

We admit there are uncertainties regarding the extent of the risks due to mercury emissions from specific anthropogenic sources. For example, there is no

quantification of how much of the MeHg in fish consumed by the U.S. population is due to emissions from chlor-alkali plants relative to other mercury sources (e.g., natural and other anthropogenic sources). Nonetheless, chlor-alkali plants are significant sources of mercury emissions which contribute to the environmental loadings and to the exposures for humans.

5. What are the effects of aggregate exposures?

People living close to chlor-alkali plants could be exposed to elemental or divalent at elevated levels through inhalation of contaminated air and exposed to some divalent mercury and MeHg through ingestion of home grown plants. If these same people consumed fish from local ponds, they would be exposed to additional quantities of MeHg. These exposure pathways could be additional to those exposures more commonly experienced in the general U.S. populations such as through the consumption of various commercial fish (e.g., tuna, pollack, swordfish) and from dental fillings containing mercury amalgams. These exposures are also, because of mercury's half-life in the human body, additional to some portion of a person's previous mercury exposures. For people living close to chlor-alkali plants, this combination of sources may lead to elevated mercury

exposures and body burdens. The degree or extent to which this occurs will largely depend on lifestyles, consumption patterns and other characteristics of this population.

6. What are the exposures and risks for children?

Exposures for children could be greater than exposures for adults because children consume more food and breathe more air per body weight than adults. Children are also potentially more sensitive to the toxic effects of mercury than adults because their nervous systems are still developing. In addition, exposures to MeHg for women who are pregnant, or who may become pregnant, are of particular concern because of potential effects on the developing fetus.

7. How do chlor-alkali plant emissions contribute to global mercury levels?

Mercury is a global pollutant. Emissions, especially those in the elemental form, can transport very long distances and become part of the global pool. In addition to their potential contributions to mercury exposures locally, chlor-alkali plants are one of the many sources contributing to the global pool and to overall mercury levels in the environment.

8. How did the EPA consider impacts on children's health in the development of today's proposed rule?

Partly due to our concerns for children's health protection, we have strived to develop the proposed rule such that it will result in the greatest emissions reductions that are, consistent with section 112(d) of the CAA, currently technically and economically feasible. Today's proposed rule is based on the best available control technologies and stringent management practices. The emissions reductions achieved through the proposed rule will help reduce the mercury exposures to humans, including children.

E. Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104-4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, the EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that may result in expenditures by State, local, and Tribal governments, in aggregate, or by the private sector, of \$100 million or more in any 1 year. Before promulgating

an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires the EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows the EPA to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the Administrator publishes with the final rule an explanation as to why that alternative was not adopted. Before the EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including Tribal governments, it must have developed under section 203 of the UMRA, a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

The EPA has determined that the proposed rule does not contain a Federal mandate that may result in expenditures of \$100 million or more for State, local, and Tribal governments, in the aggregate, or the private sector in any 1 year. The maximum total annual cost of the proposed rule for any year has been estimated to be less than about \$2.5 million. Thus, today's proposed rule is not subject to the requirements of sections 202 and 205 of the UMRA. In addition, the EPA has determined that the proposed rule contains no regulatory requirements that might significantly or uniquely affect small governments because it contains no requirements that apply to such governments or impose obligations upon them. Therefore, today's proposed rule is not subject to the requirements of section 203 of the UMRA.

Because the proposed rule does not include a Federal mandate and is estimated to result in expenditures less than \$100 million in any 1 year by State, local, and Tribal governments, the EPA has not prepared a budgetary impact statement or specifically addressed the selection of the least costly, most cost-effective, or least burdensome alternative. In addition, because small governments will not be significantly or uniquely affected by the proposed rule, the EPA is not required to

develop a plan with regard to small governments.

Therefore, the requirements of the UMRA do not apply to this action.

F. Regulatory Flexibility Act (RFA), as Amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA)

The RFA generally requires that an agency conduct a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of today's proposed rule on small entities, small entity is defined as: (1) a small business with less than 1,000 employees, (according to the Small Business Administration definition of a small business in SIC 2812); (2) a small governmental jurisdiction that is a government of a city, county, town, school district, or special district with a population of less than 50,000; or (3) a small organization that is any not-for-profit enterprise which

is independently owned and operated and is not dominant in its field.

After considering the economic impact of today's proposed rule on small entities, I certify that this action will not have a significant impact on a substantial number of small entities. In accordance with the RFA, we conducted an assessment of the proposed standards on small businesses within the chlorine manufacturing industry. Based on definition of a small entity explained above, we identified three of the eight companies that own mercury cell chlor-alkali plants as small. Although small businesses represent 30 percent of the companies within the source category, they are expected to incur only 18 percent of the total industry annual compliance costs. There are no companies with compliance costs equal to or greater than 1 percent of their sales. No firms are expected to close rather than incur the costs of compliance with the proposed rule. Furthermore, firms are not projected to shut down their facilities due to the proposed rule.

Although the proposed rule will not have a significant economic impact on a substantial number of small entities, we have nonetheless worked aggressively

to minimize the impact of the proposed rule on small entities, consistent with our obligation under the CAA.

In summary, this analysis supports today's certification under the RFA because no firms experience a significant impact due to the proposed rule. For more information, consult the docket for the proposed rule.

G. Paperwork Reduction Act

The information collection requirements in this proposed rule will be submitted for approval to OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. An information collection request (ICR) document has been prepared by the EPA for mercury cell chlor-alkali plants (ICR No. 2046.01), and a copy may be obtained from Sandy Farmer by mail at the Office of Environmental Information, Collection Strategies Division (2822), U.S. EPA, 1200 Pennsylvania Avenue, NW, Washington, DC 20460, by email at farmer.sandy@epa.gov, or by calling (202) 260-2740. A copy may also be downloaded off the internet at <http://www.epa.gov/icr>. The information requirements are not effective until OMB approves them.

The information requirements are based on notification, recordkeeping, and reporting requirements in the NESHAP General Provisions (40 CFR part 63, subpart A), which are

mandatory for all operators subject to national emission standards. These recordkeeping and reporting requirements are specifically authorized by section 114 of the CAA (42 U.S.C. 7414). All information submitted to the EPA pursuant to the recordkeeping and reporting requirements for which a claim of confidentiality is made is safeguarded according to Agency policies set forth in 40 CFR part 2, subpart B.

The proposed rule contains monitoring, inspection, recordkeeping, and reporting requirements. The monitoring requirements are associated with the use of control devices to observe operating limits for by-product hydrogen streams, end-box ventilation system vents, and mercury thermal recovery unit vents. The inspection requirements are associated with the observation of work practice standards for cell rooms, hydrogen systems, caustic systems, and the storage of mercury-containing wastes. The recordkeeping and reporting requirements are the means of complying with emission limitations and work practice standards in the proposed rule.

The respondent universe consists of twelve existing mercury cell chlor-alkali plants in the U.S. which would need to comply with requirements within 2 years of the

effective date of the subpart. The annual respondent monitoring, inspection, recordkeeping, and reporting burden for this collection of information (averaged over the first 3 years after the effective date of the subpart) is estimated to total about 14,000 labor hours at a total annual cost of about \$630,000. This estimate includes rule review and planning; initial notification (one-time) to the EPA; one-time preparation of a startup, shutdown, and malfunction plan with semiannual reports if procedures in the plan were followed or immediate reporting if they were not followed; one-time preparation of a site-specific monitoring plan addressing performance and equipment specifications as well as procedures for performance evaluation, ongoing operation and maintenance, ongoing data quality assurance, and ongoing recordkeeping and reporting for continuous mercury vapor monitors for vents; acquisition and installation of vent monitors; performance testing for each vent (one time in the 3 year period), including notification of intent to conduct testing and establishment of vent mercury concentration operating limits; reporting of test results, including one-time preparation of notification of compliance status for vents; one-time preparation of a washdown plan; one-time preparation of notification of

compliance status for work practice standards; continuous monitoring of vent outlet elemental mercury concentration and recording of data; recording of information related to the washdown plan; inspections and keeping records related to equipment problems, deficiencies in floors, pillars, and beams, caustic leaks, liquid mercury spills and accumulations, liquid mercury leaks, and hydrogen/mercury vapor leaks; keeping records related to liquid mercury collection; keeping records related to storage of mercury-containing wastes; and preparation of semiannual compliance reports.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the

collection of information; and transmit or otherwise disclose the information.

An Agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for our rules are listed in 40 CFR part 9 and 48 CFR chapter 15.

Comments are requested on EPA's need for this information, the accuracy of the burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques. Send comments on the ICR to the Director, Collection Strategies Division (2822), U.S. EPA (2136), 1200 Pennsylvania Avenue, NW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW, Washington, DC 20503, marked "Attention: Desk Office for EPA." Include the ICR number in any correspondence. Because OMB is required to make a decision concerning the ICR between 30 and 60 days after [INSERT DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER], a comment to OMB is best assured of having its full effect if OMB receives it by [INSERT DATE 30 DAYS AFTER PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL

REGISTER]. The final rule will respond to any OMB or public comments on the information collection requirements contained in the proposed rule.

H. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) of 1995 (Public Law No. 104-113; 15 U.S.C. 272 note) directs the EPA to use voluntary consensus standards in their regulatory and procurement activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, business practices) developed or adopted by one or more voluntary consensus bodies. The NTTAA directs the EPA to provide Congress, through annual reports to OMB, with explanations when an agency does not use available and applicable voluntary consensus standards.

The proposed rule involve technical standards. The EPA proposes in the proposed rule to use EPA Methods 1, 1A, 2, 2A, 2C, 2D, 3, 3A, 3B, 4, 5, 101, 101A, and 102. Consistent with the NTTAA, the EPA conducted searches to identify voluntary consensus standards in addition to these EPA methods. No applicable voluntary consensus

standards were identified for EPA Methods 1A, 2A, 2D, and 102. The search and review results have been documented and are placed in the docket (No. A-2000-32) for the proposed rule.

This search for emissions monitoring procedures identified 14 voluntary consensus standards and 5 draft standards. The EPA determined that the 14 standards were impractical alternatives to EPA test methods for the purposes of the proposed rule. Therefore, the EPA does not propose to adopt these 14 voluntary consensus standards in the proposed rule. The detailed EPA review comments for these 14 standards are in the docket for the proposed rule (Please see docket No. A-2000-32).

The 14 voluntary consensus standards are as follows: ASME C00031 or PTC 19-10-1981, "Part 10 Flue and Exhaust Gas Analyses," for EPA Method 3; ASME PTC-38-80 R85 or C00049, "Determination of the Concentration of Particulate Matter in Gas Streams," for EPA Method 5; ASTM D3154-91 (1995), "Standard Method for Average Velocity in a Duct (Pitot Tube Method)," for EPA Methods 1, 2, 2C, 3, 3B, and 4; ASTM D3464-96, "Standard Test Method Average Velocity in a Duct Using a Thermal Anemometer," for EPA Method 2; ASTM D3685/D3685M-98, "Test Methods for Sampling and Determination of

Particulate Matter in Stack Gases," for EPA Method 5; ASTM D3796-90 (1998), "Standard Practice for Calibration of Type S Pitot Tubes," for EPA Method 2; ASTM D5835-95, "Standard Practice for Sampling Stationary Source Emissions for Automated Determination of Gas Concentration," for EPA Methods 3A; ASTM E337-84 (Reapproved 1996), "Standard Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures)," for EPA Method 4; CAN/CSA Z223.1-M1977, "Method for the Determination of Particulate Mass Flows in Enclosed Gas Streams," for EPA Method 5; CAN/CSA Z223.2-M86 (1986), "Method for the Continuous Measurement of Oxygen, Carbon Dioxide, Carbon Monoxide, Sulphur Dioxide, and Oxides of Nitrogen in Enclosed Combustion Flue Gas Streams," for EPA Methods 3A; CAN/CSA Z223.26-M1987, "Measurement of Total Mercury in Air Cold Vapour Atomic Absorption Spectrophotometric Method," for EPA Methods 101 and 101A; ISO 9096:1992 (in review 2000), "Determination of Concentration and Mass Flow Rate of Particulate Matter in Gas Carrying Ducts - Manual Gravimetric Method," for EPA Method 5; ISO 10396:1993, "Stationary Source Emissions: Sampling for the Automated Determination of Gas Concentrations," for EPA Method 3A; ISO 10780:1994,

"Stationary Source Emissions - Measurement of Velocity and Volume Flowrate of Gas Streams in Ducts," for EPA Method 2.

Five of the standards identified in this search were not available at the time the review was conducted for the purposes of the proposed rule because they are under development by a voluntary consensus body: ASME/BSR MFC 12M, "Flow in Closed Conduits Using Multiport Averaging Pitot Primary Flowmeters," for EPA Method 2; ASME/BSR MFC 13M, "Flow Measurement by Velocity Traverse," for EPA Method 2 (and possibly 1); ISO/DIS 12039, "Stationary Source Emissions - Determination of Carbon Monoxide, Carbon Dioxide, and Oxygen - Automated Methods," for EPA Method 3A; PREN 13211 (1998), "Air Quality - Stationary Source Emissions - Determination of the Concentration of Total Mercury," for EPA Methods 101, 101A (and mercury portion of EPA Method 29); and ASTM Z6590Z, "Manual Method for Both Speciated and Elemental Mercury" is a potential alternative for portions of EPA Methods 101A and Method 29 (mercury portion only).

We are not proposing to include these five draft voluntary consensus standards in the proposed rule. The EPA, however, will review the standards when they are

final. The review comments for these five standards are in the same docket entry as cited above.

The EPA takes comment on the compliance demonstration requirements in the proposed rule and specifically invites the public to identify potentially-applicable voluntary consensus standards. Commenters should also explain why the proposed rule should adopt these voluntary consensus standards in lieu of or in addition to EPA's standards. Emission test methods submitted for evaluation should be accompanied with a basis for the recommendation, including method validation data and the procedure used to validate the candidate method (if a method other than Method 301, 40 CFR part 63, appendix A was used).

Section 63.8232 of the proposed standards lists the EPA testing methods included in the proposed rule. Under §63.8 of the NESHAP General Provisions, a source may apply to the EPA for permission to use alternative monitoring in place of any of the EPA testing methods.

I. Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use

The proposed rule is not subject to Executive Order 13211 (66 FR 28355, May 22, 2001) because it is not

a significant regulatory action under Executive Order 12866.

List of Subjects in 40 CFR Part 63

Environmental protection, Air emissions control,
Hazardous air pollutants, Reporting and recordkeeping
requirements.

Dated: June 17, 2002.

Christine Todd Whitman,
Administrator

For the reasons stated in the preamble, title 40, chapter I, part 63 of the Code of the Federal Regulations is proposed to be amended as follows:

PART 63--[AMENDED]

1. The authority citation for part 63 continues to read as follows:

Authority: 42 U.S.C. 7401, et seq.

2. Part 63 amended by adding Subpart IIIII to read as follows:

Subpart IIIII - National Emission Standards for Hazardous Air Pollutants for Mercury Cell Chlor-Alkali Plants
Sec.

What this Subpart Covers

- 63.8180 What is the purpose of this subpart?
- 63.8182 Am I subject to this subpart?
- 63.8184 What parts of my plant does this subpart cover?
- 63.8186 When do I have to comply with this subpart?

Emission Limitations and Work Practice Standards

- 63.8190 What emission limitations must I meet?
- 63.8192 What work practice standards must I meet?

Operation and Maintenance Requirements

- 63.8222 What are my operation and maintenance requirements?

General Compliance Requirements

- 63.8226 What are my general requirements for complying with this subpart?

Initial Compliance Requirements

- 63.8230 By what date must I conduct performance tests or other initial compliance demonstrations?
- 63.8231 When must I conduct subsequent performance tests?
- 63.8232 What test methods and other procedures must I use to demonstrate initial compliance with the emission limits?
- 63.8234 What equations and procedures must I use?
- 63.8236 How do I demonstrate initial compliance with the emission limitations and work practice standards?

Continuous Compliance Requirements

- 63.8240 What are my monitoring requirements?

- 63.8242 What are the installation, operation, and maintenance requirements for my mercury concentration continuous monitoring systems?
- 63.8244 How do I monitor and collect data to demonstrate continuous compliance?
- 63.8246 How do I demonstrate continuous compliance with the emission limitations and work practice standards?
- 63.8248 What other requirements must I meet to demonstrate continuous compliance?

Notifications, Reports, and Records

- 63.8252 What notifications must I submit and when?
- 63.8254 What reports must I submit and when?
- 63.8256 What records must I keep?
- 63.8258 In what form and how long must I keep my records?

Other Requirements and Information

- 63.8262 What parts of the General Provisions apply to me?
- 63.8264 Who implements and enforces this subpart?
- 63.8266 What definitions apply to this subpart?

Tables to Subpart IIIII of Part 63

- Table 1 to Subpart IIIII of Part 63. Work Practice Standards - Design, Operation, and Maintenance Requirements
- Table 2 to Subpart IIIII of Part 63. Work Practice Standards - Required Inspections
- Table 3 to Subpart IIIII of Part 63. Work Practice Standards - Required Actions for Liquid Mercury Spills and Accumulations and Hydrogen and Mercury Vapor Leaks
- Table 4 to Subpart IIIII of Part 63. Work Practice Standards - Requirements for Mercury Liquid Collection
- Table 5 to Subpart IIIII of Part 63. Work Practice Standards - Requirements for Handling and Storage of Mercury-Containing Wastes
- Table 6 to Subpart IIIII of Part 63. Required Elements of Washdown Plans
- Table 7 to Subpart IIIII of Part 63. Examples of Techniques for Equipment Problem Identification, Leak Detection and Mercury Vapor Measurements
- Table 8 to Subpart IIIII of Part 63. Required Records for Work Practice Standards

Table 9 to Subpart IIIII of Part 63. Applicability of
General Provisions to Subpart IIIII

**Subpart IIIII - National Emission Standards for Hazardous
Air Pollutants for Mercury Cell Chlor-Alkali Plants**

What this Subpart Covers

§63.8180 What is the purpose of this subpart?

This subpart establishes national emission standards for hazardous air pollutants (NESHAP) for sources of mercury emissions at mercury cell chlor-alkali plants. This subpart also establishes requirements to demonstrate initial and continuous compliance with all applicable emission limitations and work practice standards in this subpart.

§63.8182 Am I subject to this subpart?

(a) You are subject to this subpart if you own or operate a mercury cell chlor-alkali plant.

(b) You are required to obtain a title V permit for each source subject to this subpart, whether your source is (or is part of) a major source of hazardous air pollutant (HAP) emissions or an area source of HAP emissions. A major source of HAP is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons or more per year or any combination of HAP at a rate of 25 tons or more per year. An area

source of HAP is a plant site that has the potential to emit HAP but is not a major source.

(c) Beginning on [DATE 2 YEARS FROM THE DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER], the provisions of subpart E of 40 CFR part 61 that apply to mercury chlor-alkali plants, which are listed in paragraphs (c)(1) through (3) of this section, are no longer applicable.

(1) 40 CFR 61.52(a).

(2) 40 CFR 61.53(b) and (c).

(3) 40 CFR 61.55(b), (c) and (d).

§63.8184 What parts of my plant does this subpart cover?

(a) This subpart applies to each affected source at a plant site where chlorine and caustic are produced in mercury cells. This subpart applies to two types of affected sources: the mercury cell chlor-alkali production facility, as defined in paragraph (a)(1) of this section; and the mercury recovery facility, as defined in paragraph (a)(2) of this section.

(1) The mercury cell chlor-alkali production facility designates an affected source consisting of all cell rooms and ancillary operations used in the manufacture of product chlorine, product caustic, and by-

product hydrogen at a plant site. This subpart covers mercury emissions from by-product hydrogen streams, end-box ventilation system vents, and fugitive emission sources associated with cell rooms, hydrogen systems, caustic systems, and storage areas for mercury-containing wastes.

(2) The mercury recovery facility designates an affected source consisting of all processes and associated operations needed for mercury recovery from wastes at a plant site. This subpart covers mercury emissions from mercury thermal recovery unit vents and fugitive emission sources associated with storage areas for mercury-containing wastes.

(b) An affected source at your mercury cell chlor-alkali plant is existing if you commenced construction of the affected source before [INSERT DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER].

(c) A mercury recovery facility is a new affected source if you commence construction or reconstruction of the affected source after [INSERT DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER]. An affected source is reconstructed if it meets the definition of "reconstruction" in §63.2.

§63.8186 When do I have to comply with this subpart?

(a) If you have an existing affected source, you must comply with each emission limitation, work practice standard, and recordkeeping and reporting requirement in this subpart that applies to you no later than [DATE 2 YEARS FROM THE DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER].

(b) If you have a new or reconstructed mercury recovery facility and its initial startup date is on or before [DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER], you must comply with each emission limitation, work practice standard, and recordkeeping and reporting requirement in this subpart that applies to you by [DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER].

(c) If you have a new or reconstructed mercury recovery facility and its initial startup date is after [DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER], you must comply with each emission limitation, work practice standard, and recordkeeping and reporting requirement in this subpart that applies to you upon initial startup.

(d) You must meet the notification and schedule requirements in §63.8252. Several of these notifications

must be submitted before the compliance date for your affected source(s).

Emission Limitations and Work Practice Standards

§63.8190 What emission limitations must I meet?

(a) Emission limits. You must meet each emission limit in paragraphs (a)(1) through (3) of this section that applies to you.

(1) New or reconstructed mercury cell chlor-alkali production facility. Emissions of mercury are prohibited from a new or reconstructed mercury cell chlor-alkali production facility.

(2) Existing mercury cell chlor-alkali production facility. You must not discharge to the atmosphere aggregate mercury emissions in excess of the applicable limit in paragraph (a)(2)(i) or (ii) of this section.

(i) 0.067 grams of mercury per megagram of chlorine produced (1.3×10^{-4} pounds of mercury per ton of chlorine produced) from all by-product hydrogen streams and all end-box ventilation system vents when both types of emission points are present.

(ii) 0.033 grams of mercury per megagram of chlorine produced (6.59×10^{-5} pounds of mercury per ton of chlorine produced) from all by-product hydrogen streams when there are no end-box ventilation systems.

(3) New, reconstructed, or existing mercury recovery facility. You must not discharge to the atmosphere mercury emissions in excess of the applicable limit in paragraph (a)(3)(i) or (ii) of this section.

(i) 23 milligrams per dry standard cubic meter from each oven type mercury thermal recovery unit vent.

(ii) 4 milligrams per dry standard cubic meter from each non-oven type mercury thermal recovery unit vent.

(b) Operating limits. You must meet each operating limit in paragraphs (b)(1) and (2) of this section that applies to you.

(1) Existing mercury cell chlor-alkali production facility. You must maintain the daily average mercury concentration in each by-product hydrogen stream no higher than the level established during the initial performance test. You must maintain the daily average mercury concentration in each end-box ventilation system vent exhaust no higher than the level established during the initial performance test.

(2) New, reconstructed, or existing mercury recovery facility. You must maintain the daily average mercury concentration in each oven type mercury thermal recovery unit vent exhaust no higher than the level established during the initial performance test. You

must maintain the daily average mercury concentration in each non-oven type mercury thermal recovery unit vent exhaust no higher than the level established during the initial performance test.

§63.8192 What work practice standards must I meet?

(a) You must meet the work practice standards in Tables 1 through 5 to this subpart.

(b) You must adhere to the response intervals specified in Tables 1 through 5 to this subpart at all times. Nonadherence to the intervals in Tables 1 through 5 to this subpart constitutes a deviation and must be documented and reported in the compliance report, as required by §63.8254(c), with the date and time of the deviation, cause of the deviation, a description of the conditions, and time actual compliance was achieved.

(c) As provided in §63.6(g), you may request to use an alternative to the work practice standards in Tables 1 through 5 to this subpart.

(d) You must prepare, submit, and operate according to a written washdown plan designed to minimize fugitive mercury emissions through routine washing of surfaces where liquid mercury could accumulate. The written plan must address the elements contained in Table to this subpart.

(e) You must institute a cell room monitoring program to continuously monitor the elemental mercury vapor concentration in the upper portion of each cell room against a predetermined site-specific action level(s). When a mercury concentration is detected that exceeds the established action level(s), you must identify the cause of the elevated concentration and take corrective action as quickly as possible. At a minimum, these follow-up activities should include the relevant work practices in Tables 1 through 5 to this subpart. You must also keep records related to the inspections and corrective actions performed.

Operation and Maintenance Requirements

§63.8222 What are my operation and maintenance requirements?

As required by §63.6(e)(1)(i), you must always operate and maintain your affected source(s), including air pollution control and monitoring equipment, in a manner consistent with good air pollution control practices for minimizing emissions at least to the levels required by this subpart.

General Compliance Requirements

§63.8226 What are my general requirements for complying with this subpart?

(a) You must be in compliance with the emission limitations (including operating limits) for by-product hydrogen streams, end-box ventilation system vents, and mercury thermal recovery unit vents in §63.8190 at all times, except during periods of startup, shutdown, and malfunction. You must be in compliance with the applicable work practice standards in §63.8192 at all times, except during periods of startup, shutdown, and malfunction.

(b) During the period between the compliance date specified for your affected source in §63.8186 and the date upon which mercury concentration continuous monitoring systems (CMS) have been installed and certified and any applicable operating limits have been set, you must maintain a log detailing the operation and maintenance of the process and emissions control equipment.

(c) You must develop and implement a written startup, shutdown, and malfunction plan (SSMP) according to the provisions in §63.6(e)(3).

Initial Compliance Requirements

§63.8230 By what date must I conduct performance tests or other initial compliance demonstrations?

(a) As required in §63.7(a)(2), you must conduct a performance test within 180 calendar days of the compliance date that is specified in §63.8186 for your affected source to demonstrate initial compliance with the emission limits in §63.8190(a)(2) for by-product hydrogen streams and end-box ventilation system vents and the emission limits in §63.8190(a)(3) for mercury thermal recovery unit vents.

(b) For each work practice standard in §63.8192 where initial compliance is not demonstrated using a performance test, you must demonstrate initial compliance within 30 calendar days after the compliance date that is specified for your affected source in §63.8186.

(c) If you commenced construction or reconstruction of a mercury recovery facility between [INSERT DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER] and [DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER], you must demonstrate initial compliance with either the proposed emission limit or the promulgated emission limit no later than [DATE 180 DAYS AFTER THE DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER] or no later than 180 days after startup of the source, whichever is later, according to §63.7(a)(2)(ix).

(d) If you commenced construction or reconstruction of a mercury recovery facility between [INSERT DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER] and [INSERT DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER], and you chose to comply with the proposed emission limit when demonstrating initial compliance, you must conduct a second performance test to demonstrate compliance with the promulgated emission limit by [DATE 3 YEARS AND 180 DAYS AFTER THE DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER], or after startup of the source, whichever is later, according to §63.7(a)(2)(ix).

§63.8231 When must I conduct subsequent performance tests?

You must conduct subsequent performance tests to demonstrate compliance with the emission limits in §63.8190(a)(2) for by-product hydrogen streams and end-box ventilation system vents and the emission limits in §63.8190(a)(3) for mercury thermal recovery unit vents no less frequently than twice (at mid-term and renewal) during each term of each title V permit.

§63.8232 What test methods and other procedures must I use to demonstrate initial compliance with the emission limits?

You must conduct a performance test for each by-product hydrogen stream, end-box ventilation system vent, and mercury thermal recovery unit vent according to the requirements in §63.7(e)(1) and the conditions detailed in paragraphs (a) through (f) of this section.

(a) You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in §63.7(e)(1).

(b) For each performance test, you must develop a site-specific test plan in accordance with §63.7(c)(2).

(c) You must conduct at least three valid test runs in order to comprise a performance test, as specified in §63.7(e)(3). To be considered a valid test run, the sampling time must be at least 2 hours and the mercury concentration in the field sample must be at least 2 times the limit of detection for the analytical method.

(d) You must use the test methods specified in paragraphs (d)(1) through (4) of this section and the applicable test methods in paragraphs (d)(5) through (7) of this section.

(1) Method 1 or 1A in appendix A of 40 CFR part 60 to determine the sampling port locations and the location and required number of sampling traverse points.

(2) Method 2, 2A, 2C, or 2D in appendix A of 40 CFR part 60 to determine the stack gas velocity and volumetric flow rate.

(3) Method 3, 3A, or 3B in appendix A of 40 CFR part 60 to determine the stack gas molecular weight.

(4) Method 4 in appendix A of 40 CFR part 60 to determine the stack gas moisture content.

(5) For each by-product hydrogen stream, Method 102 in appendix A of 40 CFR part 61 to measure the mercury emission rate after the last control device.

(6) For each end-box ventilation system vent, Method 101 or 101A in appendix A of 40 CFR part 61 to measure the mercury emission rate after the last control device.

(7) For each mercury thermal recovery unit vent, Method 101 or 101A in appendix A of 40 CFR part 61 to measure the mercury emission rate after the last control device.

(e) During each test run for a by-product hydrogen stream and each test run for an end-box ventilation system vent, you must continuously measure the electric current through the operating mercury cells and record a measurement at least once every 15 minutes.

(f) During each test run for a mercury thermal recovery unit vent, the mercury-containing waste processed in the retort must be the type of waste that results in the highest mercury concentration in the mercury thermal recovery unit vent. You must document the mercury content of this type of waste and an explanation of why it results in the highest mercury concentration in the site-specific test plan required in §63.8232(b).

§63.8234 What equations and procedures must I use?

(a) To determine the grams of mercury discharged per megagram (grams Hg/Mg Cl₂) of chlorine produced from all by-product hydrogen streams and all end-box ventilation system vents, if applicable, at a mercury cell chlor-alkali production facility, you must follow the procedures in paragraphs (a)(1) through (6) of this section.

(1) Determine the mercury emission rate for each test run, R_{run} , in grams per day for each by-product hydrogen stream and for each end-box ventilation system vent, if applicable, from Method 101, 101A, or 102 (40 CFR part 61).

(2) Calculate the average measured electric current through the operating mercury cells during each test run

for each by-product hydrogen stream and for each end-box ventilation system vent, if applicable, using Equation 1 of this section as follows:

$$CL_{avg,run} = \frac{\sum_{i=1}^n CL_{i,run}}{n} \quad (\text{Eq. 1})$$

Where:

- $CL_{avg,run}$ = Average measured cell line current load during the test run, amperes;
- $CL_{i,run}$ = Individual cell line current load measurement (i.e., 15 minute reading) during the test run, amperes; and
- n = Number of cell line current load measurements taken over the duration of the test run.

(3) Calculate the amount of chlorine produced during each test run for each by-product hydrogen stream and for each end-box ventilation system vent, if applicable, using Equation 2 of this section as follows:

$$P_{Cl_2,run} = (1.3 \times 10^{-6}) (CL_{avg,run}) (n_{cells,run}) (t_{run}) \quad (\text{Eq. 2})$$

Where:

- $P_{Cl_2,run}$ = Amount of chlorine produced during the test run, megagrams chlorine ($Mg\ Cl_2$) ;
- 1.3×10^{-6} = Theoretical chlorine production rate factor, $Mg\ Cl_2$ per hour per ampere per cell;
- $CL_{avg,run}$ = Average measured cell line current load during test run, amperes, calculated using Equation 1 of this section;
- $n_{cell,run}$ = Number of cells on-line during the test run; and
- t_{run} = Duration of test run, hours.

(4) Calculate the mercury emission rate in grams of mercury per megagram of chlorine produced for each test run for each by-product hydrogen stream and for each end-box ventilation system vent, if applicable, using Equation 3 of this section as follows:

$$E_{Hg,run} = \left[\frac{(R_{run})(t_{run})}{(24)(P_{Cl2,run})} \right] \quad (\text{Eq. 3})$$

Where:

$E_{Hg,run}$ = Mercury emission rate for the test run, grams Hg/Mg Cl_2 ;
 R_{run} = Measured mercury emission rate for the test run from paragraph (a)(1) of this section, grams Hg per day;
 t_{run} = Duration of test run, hours;
 24 = Conversion factor, hours per day; and
 $P_{Cl2,run}$ = Amount of chlorine produced during the test run, calculated using Equation 2 of this section, Mg Cl_2 .

(5) Calculate the average mercury emission rate for each by-product hydrogen stream and for each end-box ventilation system vent, if applicable, using Equation 4 of this section as follows:

$$E_{Hg,avg} = \frac{\sum_{i=1}^n E_{Hg,run}}{n} \quad (\text{Eq. 4})$$

Where:

- $E_{Hg, avg}$ = Average mercury emission rate for the by-product hydrogen stream or the end-box ventilation system vent, if applicable, grams Hg/Mg Cl_2 ;
- $E_{Hg, run}$ = Mercury emission rate for each test run for the by-product hydrogen stream or the end-box ventilation system vent, if applicable, grams Hg/Mg Cl_2 , calculated using Equation 3 of this section; and
- n = Number of test runs conducted for the by-product hydrogen stream or the end-box ventilation system vent, if applicable.

(6) Calculate the total mercury emission rate from all by-product hydrogen streams and all end-box ventilation system vents, if applicable, at the mercury cell chlor-alkali production facility using Equation 5 of this section as follows:

$$E_{Hg, H_2EB} = \sum_{i=1}^n E_{Hg, avg} \quad (\text{Eq. 5})$$

Where:

- E_{Hg, H_2EB} = Total mercury emission rate from all by-product hydrogen streams and all end-box ventilation system vents, if applicable, at the affected source, grams Hg/Mg Cl_2 ;
- $E_{Hg, avg}$ = Average mercury emission rate for each by-product hydrogen stream and each end-box ventilation system vent, if applicable, grams Hg/Mg Cl_2 , determined using Equation 4 of this section; and
- n = total number of by-product hydrogen streams and end-box ventilation system vents at the affected source.

(b) To determine the milligrams of mercury per dry standard cubic meter exhaust discharged from mercury thermal recovery unit vents, you must follow the procedures in paragraphs (b)(1) and (2) of this section.

(1) Calculate the concentration of mercury in milligrams of mercury per dry standard cubic meter of exhaust for each test run for each mercury thermal recovery unit vent using Equation 6 of this section as follows:

$$C_{Hg,run} = \left[\frac{(m_{Hg}) (10^{-3})}{(V_{m(std)})} \right] \quad (\text{Eq. 6})$$

Where:

$C_{Hg,run}$ = Mercury concentration for the test run, milligrams of mercury per dry standard cubic meter of exhaust;
 m_{Hg} = Mass of mercury in test run sample, from Method 101, 101A, or 102, micrograms;
 10^{-3} = Conversion factor, milligrams per microgram; and
 $V_{m(std)}$ = Dry gas sample volume at standard conditions, from Method 101, 101A, or 102, dry standard cubic meters.

(2) Calculate the average concentration of mercury in each mercury thermal recovery unit vent exhaust using Equation 7 of this section as follows:

$$C_{Hg,avg} = \frac{\sum_{i=1}^n C_{Hg,run}}{n} \quad (\text{Eq. 7})$$

Where:

- $C_{Hg,avg}$ = Average mercury concentration for the mercury thermal recovery unit vent, milligrams of mercury per dry standard cubic meter exhaust;
- $C_{Hg,run}$ = Mercury concentration for each test run, milligrams of mercury per dry standard cubic meter of exhaust, calculated using Equation 6 of this section; and
- n = Number of test runs conducted for the mercury thermal recovery unit vent.

(c) For each by-product hydrogen stream, each end-box ventilation system vent, and each mercury thermal recovery unit vent, you must establish a site-specific mercury concentration operating limit according to the procedures in paragraphs (c)(1) and (2) of this section.

(1) Using a mercury concentration CMS required in §63.8240, measure and record the elemental mercury concentration after the last control device at least once every 15 minutes for the entire duration of each performance test run.

(2) Calculate the mercury concentration operating limit based on the mercury concentration monitoring data obtained during each valid test run of the performance test during which the mercury emissions did not exceed

the applicable mercury emission limit in §63.8190(a)(2) through (3) using Equation 8 of this section as follows:

$$OL_{Hgconc} = \frac{\left(\sum_{i=1}^n C_{Hg,i} \right)}{n} \quad (\text{Eq. 8})$$

Where:

- OL_{Hgconc} = Mercury concentration operating limit, ppmv or concentration units selected by the owner/operator;
- $C_{Hg,i}$ = Concentration of elemental mercury measured at the interval i (i.e., 15 minute reading) during each valid test run of the performance test during which the mercury emissions did not exceed the applicable mercury emission limit in §63.8190(a)(2) through (3) using a mercury concentration CMS, ppmv or concentration units selected by the owner/operator; and
- n = Number of concentration measurements taken during all test runs of the performance test.

(d) You may change a mercury concentration operating limit by following the requirements in paragraphs (d)(1) through (3) of this section.

(1) Submit a written notification to the Administrator of your intent to conduct a new performance test to revise the mercury concentration operating limit at least 60 calendar days before the test is scheduled to begin.

(2) Conduct a performance test and demonstrate compliance with the applicable emission limit.

(3) Establish a revised mercury concentration operating limit according to the procedures in paragraph (c) of this section.

(e) You must calculate the daily average elemental mercury concentration using Equation 9 of this section as follows:

$$C_{Hg,dailyavg} = \frac{\left(\sum_{i=1}^n C_{Hg,i} \right)}{n} \quad (\text{Eq. 9})$$

Where:

$C_{Hg,dailyavg}$ = Average elemental mercury concentration for the operating day, ppmv or concentration units selected by the owner/operator;

$C_{Hg,i}$ = Concentration of elemental mercury measured at the interval i (i.e., 15 minute reading) using a mercury concentration CMS, ppmv or concentration units selected by the owner/operator; and

n = Number of concentration measurements taken during the operating day.

§63.8236 How do I demonstrate initial compliance with the emission limitations and work practice standards?

(a) For each mercury cell chlor-alkali production facility, you have demonstrated initial compliance with

the emission limits for by-product hydrogen streams and end-box ventilation system vents in §63.8190(a)(2) if:

(1) Total mercury emission rate from all by-product hydrogen streams and all end-box ventilation system vents, if applicable, at the affected source, determined in accordance with §§63.8232 and 63.8234(a), did not exceed the applicable emission limit in §63.8190(a)(2)(i) or (ii); and

(2) You have established a mercury concentration operating limit for each by-product hydrogen stream and each end-box ventilation system vent, if applicable, in accordance with §63.8234(c), and have a record of all mercury concentration monitoring data used to establish the limit.

(b) For each mercury recovery facility, you have demonstrated initial compliance with the emission limits for mercury thermal recovery unit vents in §63.8190(a)(3) if:

(1) Mercury concentration in each mercury thermal recovery unit vent exhaust, determined in accordance with §§63.8232 and 63.8234(b), did not exceed the applicable emission limit in §63.8190(a)(3)(i) or (ii); and

(2) You have established a mercury concentration operating limit for each mercury thermal recovery unit

vent in accordance with §63.8234(c) and have a record of all mercury concentration monitoring data used to establish the limit.

(c) For each affected source, you have demonstrated initial compliance with the work practice standards in §63.8192 if you certify in your Notification of Compliance Status that you meet or will meet each of the work practice standards, if you prepare the washdown plan and mercury vapor measurement plan and submit them as part of your Notification of Compliance Status, and if you certify in the notification that you operate according to or will operate according to the plan.

(d) You must submit the Notification of Compliance Status containing the results of the initial compliance demonstration according to the requirements in §63.8252(e).

Continuous Compliance Requirements

§63.8240 What are my monitoring requirements?

For each by-product hydrogen stream, each end-box ventilation system vent, and each mercury thermal recovery unit vent, you must continuously monitor the elemental mercury concentration using a mercury

concentration CMS monitor according to the requirements in §63.8242.

§63.8242 What are the installation, operation, and maintenance requirements for my mercury concentration continuous monitoring systems?

You must install, operate, and maintain each mercury concentration CMS according to paragraphs (a) through (e) of this section.

(a) Each mercury concentration CMS must sample, analyze, and record the concentration of elemental mercury at least once every 15 minutes.

(b) Each mercury concentration CMS analyzer must have a detector with the capability to detect an elemental mercury concentration at or below 0.5 times the mercury concentration operating limit established in §63.8234(c).

(c) In lieu of a promulgated performance specification as required in §63.8(a)(2), you must develop a site-specific monitoring plan that addresses the elements in paragraphs (c)(1) through (6) of this section.

(1) Installation and measurement location downstream of the last control device for each by-product

hydrogen stream, end-box ventilation system vent, and mercury thermal recovery unit vent.

(2) Performance and equipment specifications for the sample interface, the pollutant concentration analyzer, and the data collection and reduction system.

(3) Performance evaluation procedures and acceptance criteria (i.e., calibrations).

(4) Ongoing operation and maintenance procedures in accordance with the requirements of §63.8(c)(1), (3), and (4)(ii).

(5) Ongoing data quality assurance procedures in accordance with the requirements of §63.8(d).

(6) Ongoing recordkeeping and reporting procedures in accordance the general requirements of §63.10(c), (e)(1), and (e)(2)(i).

(d) You must conduct a performance evaluation of each mercury concentration CMS in accordance with your site-specific monitoring plan.

(e) You must operate and maintain each mercury concentration CMS in continuous operation according to the site-specific monitoring plan.

§63.8244 How do I monitor and collect data to demonstrate continuous compliance?

(a) Except for monitor malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments), you must monitor elemental mercury concentration continuously (or collect data at all required intervals) at all times that the affected source is operating.

(b) You may not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels or to fulfill a minimum data availability requirement, if applicable. You must use all the data collected during all other periods in assessing compliance.

(c) A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.

§63.8246 How do I demonstrate continuous compliance with the emission limitations and work practice standards?

(a) For each by-product hydrogen stream, each end-box ventilation system vent, and each mercury thermal recovery unit vent, you must demonstrate continuous

compliance with each mercury concentration operating limit by:

(1) Collecting mercury concentration data according to §63.8244(a), representing at least 90 percent of the 15 minute periods in the operating day (with data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities not counting toward the 90 percent requirement);

(2) Reducing the mercury concentration data to daily averages using Equation 9 of §63.8234(e), not including data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities;

(3) Maintaining the daily average elemental mercury concentration no higher than the mercury concentration operating limit established in §63.8234(c); and

(4) Maintaining records of mercury concentration monitoring and daily average values, as required in §63.8256(b)(3) and (4).

(b) You must demonstrate continuous compliance with the work practice standards in §63.8192 by maintaining records in accordance with §63.8256(c).

§63.8248 What other requirements must I meet to demonstrate continuous compliance?

(a) Deviations. You must report each instance in which you did not meet each emission limitation in §63.8190 that applies to you. This includes periods of startup, shutdown, and malfunction. You also must report each instance in which you did not meet each work practice standard in §63.8192 that applies to you. These instances are deviations from the emission limitations and work practice standards in this subpart. These deviations must be reported according to the requirements in §63.8254.

(b) Startups, shutdowns, and malfunctions. During periods of startup, shutdown, and malfunction, you must operate in accordance with your startup, shutdown, and malfunction plan required in §63.8226(c).

(1) Consistent with §§63.6(e) and 63.7(e)(1), deviations that occur during a period of startup, shutdown, or malfunction are not violations if you demonstrate to the Administrator's satisfaction that you were operating in accordance with the startup, shutdown, and malfunction plan.

(2) The Administrator will determine whether deviations that occur during a period of startup,

shutdown, or malfunction are violations, according to the provisions in §63.6(e).

Notification, Reports, and Records

§63.8252 What notifications must I submit and when?

(a) You must submit all of the notifications in §§63.7(b) and (c), 63.8(e), (f) and 63.9(b) through (h) that apply to you by the dates specified.

(b) As specified in §63.9(b)(2), if you start up your affected source before [DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER], you must submit your initial notification not later than [DATE 120 DAYS AFTER THE DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER].

(c) As specified in §63.9(b)(3), if you start up your new or reconstructed mercury recovery facility on or after [DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER], you must submit your initial notification not later than 120 days after you become subject to this subpart.

(d) For each performance test that you are required to conduct for by-product hydrogen streams and end-box ventilation system vents and for mercury thermal recovery unit vents, you must submit a notification of intent to conduct a performance test at least 60 calendar days

before the performance test is scheduled to begin as required in §63.7(b)(1).

(e) You must submit a Notification of Compliance Status in accordance with paragraphs (e)(1) and (2) of this section.

(1) For each initial compliance demonstration that does not include a performance test, you must submit the Notification of Compliance Status before the close of business on the 30th calendar day following the completion of the initial compliance demonstration. This Notification of Compliance Status must certify that you meet or will meet each work practice standard in §63.8192. The washdown plan must also be submitted, and the Notification of Compliance Status must certify that you operate according to or will operate according to the plan.

(2) For each initial compliance demonstration that does include a performance test, you must submit the Notification of Compliance Status, including the performance test results, before the close of business on the 60th calendar day following the completion of the performance test according to §63.10(d)(2). The Notification of Compliance Status must contain the information in §63.9(h)(2)(ii)(A) through (G). The site-

specific monitoring plan required in §63.8242(c) must also be submitted.

§63.8254 What reports must I submit and when?

(a) Compliance report due dates. Unless the Administrator has approved a different schedule, you must submit a semiannual compliance report to your permitting authority according to the requirements in paragraphs (a)(1) through (5) of this section.

(1) The first compliance report must cover the period beginning on the compliance date that is specified for your affected source in §63.8186 and ending on June 30 or December 31, whichever date comes first after the compliance date that is specified for your affected source in §63.8186.

(2) The first compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date comes first after your first compliance report is due.

(3) Each subsequent compliance report must cover the semiannual reporting period from January 1 through June 30 or the semiannual reporting period from July 1 through December 31.

(4) Each subsequent compliance report must be postmarked or delivered no later than July 31 or January

31, whichever date comes first after the end of the semiannual reporting period.

(5) For each affected source, if your title V permitting authority has established dates for submitting semiannual reports pursuant to 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A), you may submit the first and subsequent compliance reports according to the dates the permitting authority has established instead of according to the dates in paragraphs (a)(1) through (4) of this section.

(b) Compliance report contents. Each compliance report must contain the information in paragraphs (b)(1) through (3) of this section, and as applicable, paragraphs (b)(4) through (8) of this section.

(1) Company name and address.

(2) Statement by a responsible official, with that official's name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report.

(3) Date of report and beginning and ending dates of the reporting period.

(4) If you had a startup, shutdown or malfunction during the reporting period and you took actions consistent with your startup, shutdown, and malfunction

plan, the compliance report must include the information in §63.10(d)(5)(i).

(5) If there were no deviations from the continuous compliance requirements in §63.8246 that apply to you, a statement that there were no deviations from the emission limitations and work practice standards during the reporting period.

(6) If there were no periods during which the mercury concentration CMS was out-of-control as specified in §63.8(c)(7), a statement that there were no periods during the which the mercury concentration CMS was out-of-control during the reporting period.

(7) For each deviation from the requirements for work practice standards in Tables 1 through 5 to this subpart that occurs at an affected source (including deviations where the response intervals were not adhered to as described in §63.8192(c)), the compliance report must contain the information in paragraphs (b)(1) through (4) of this section and the information in paragraphs (b)(7)(i) and (ii) of this section. This includes periods of startup, shutdown, and malfunction.

(i) The total operating time of each affected source during the reporting period.

(ii) Information on the number, duration, and cause of deviations (including unknown cause, if applicable), as applicable, and the corrective action taken.

(8) For each deviation from an emission limitation (emission limit and operating limit) occurring at an affected source where you are using a mercury concentration CMS, in accordance with the site-specific monitoring plan required in §63.8242(c), to comply with the emission limitation in this subpart, you must include the information in paragraphs (b)(1) through (4) of this section and the information in paragraphs (b)(8)(i) through (xii) of this section. This includes periods of startup, shutdown, and malfunction.

(i) The date and time that each malfunction started and stopped.

(ii) The date and time of each instance in which a continuous monitoring system was inoperative, except for zero (low-level) and high-level checks.

(iii) The date, time, and duration of each instance in which a continuous monitoring system was out-of-control, including the information in §63.8(c)(8).

(iv) The date and time that each deviation started and stopped, and whether each deviation occurred during a

period of startup, shutdown, or malfunction or during another period.

(v) A summary of the total duration of the deviation during the reporting period and the total duration as a percent of the total source operating time during that reporting period.

(vi) A breakdown of the total duration of the deviations during the reporting period including those that are due to startup, shutdown, control equipment problems, process problems, other known causes, and other unknown causes.

(vii) A summary of the total duration of continuous monitoring system downtime during the reporting period and the total duration of monitoring system downtime as a percent of the total source operating time during the reporting period.

(viii) An identification of each hazardous air pollutant that was monitored at the affected source.

(ix) A brief description of the process units.

(x) A brief description of the continuous monitoring system.

(xi) The date of the latest continuous monitoring system certification or audit.

(xii) A description of any changes in monitoring system, processes, or controls since the last reporting period.

(c) Immediate startup, shutdown, and malfunction report. If you had a startup, shutdown, or malfunction during the semiannual reporting period that was not consistent with your startup, shutdown, and malfunction plan required in §63.8226(c), you must submit an immediate startup, shutdown, and malfunction report according to the requirements in §63.10(d)(5)(ii).

(d) Part 70 monitoring report. For each affected source, you must report all deviations as defined in this subpart in the semiannual monitoring report required by 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A). If you submit a compliance report for an affected source along with, or as part of, the semiannual monitoring report required by 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A), and the compliance report includes all required information concerning deviations from any emission limitation and work practice standard in this subpart, submission of the compliance report satisfies any obligation to report the same deviations in the semiannual monitoring report. However, submission of a compliance report does not otherwise affect any

obligation you may have to report deviations from permit requirements for an affected source to your permitting authority.

§63.8256 What records must I keep?

(a) General records. You must keep the records in paragraphs (a)(1) and (2) of this section.

(1) A copy of each notification and report that you submitted to comply with this subpart, including all documentation supporting any initial notification or notification of compliance status that you submitted, according to the requirements in §63.10(b)(2)(xiv).

(2) The records in §63.6(e)(3)(iii) through (v) related to startup, shutdown, and malfunction.

(b) Records associated with the by-product hydrogen stream and end-box ventilation system vent emission limitations and the mercury thermal recovery unit vent emission limitations. You must keep the records in paragraphs (b)(1) through (5) of this section related to the emission limitations in §63.8190(a)(2) through (3) and (b).

(1) Records of performance tests as required in §63.10(b)(2)(viii).

(2) Records of the establishment of the applicable mercury concentration operating limits, including records

of the mercury concentration monitoring conducted during the performance tests.

(3) Records of the continuous mercury concentration monitoring data.

(4) Records of the daily average elemental mercury concentration values.

(5) Records associated with your site-specific monitoring plan required in §63.8242(c) (i.e., results of inspections, calibrations, and validation checks of each mercury concentration CMS).

(c) Records associated with the work practice standards. You must keep the records specified in Table 8 to this subpart related to the work practice standards in Tables 1 through 5 to this subpart. You must also maintain a copy of your current washdown plan and records of when each washdown occurs.

§63.8258 In what form and how long must I keep my records?

(a) Your records must be in a form suitable and readily available for expeditious review, according to §63.10(b)(1).

(b) As specified in §63.10(b)(1), you must keep each record for 5 years following the date of each

occurrence, measurement, maintenance, corrective action, report, or record.

(c) You must keep each record on site for at least 2 years after the date of each occurrence, measurement, maintenance, corrective action, report, or record, according to §63.10(b)(1). You can keep the records offsite for the remaining 3 years.

Other Requirements and Information

§63.8262 What parts of the General Provisions apply to me?

Table 9 to this subpart shows which parts of the General Provisions in §§63.1 through 63.13 apply to you.

§63.8264 Who implements and enforces this subpart?

(a) This subpart can be implemented and enforced by us, the United States Environmental Protection Agency (U.S. EPA), or a delegated authority such as your State, local, or tribal agency. If the U.S. EPA Administrator has delegated authority to your State, local, or tribal agency, then that agency has the authority to implement and enforce this subpart. You should contact your U.S. EPA Regional Office to find out if this subpart is delegated to your State, local, or tribal agency.

(b) In delegating implementation and enforcement authority of this subpart to a State, local, or tribal agency under subpart E of this part, the authorities contained in paragraph (c) of this section are retained by the Administrator of U.S. EPA and are not transferred to the State, local, or tribal agency.

(c) The authorities in paragraphs (c)(1) through (4) of this section will not be delegated to State, local, or tribal agencies.

(1) Approval of alternatives under §63.6(g) to the non-opacity emission limitations in §63.8190 and work practice standards in §63.8192.

(2) Approval of major alternatives to test methods under §63.7(e)(2)(ii) and (f) and as defined in §63.90.

(3) Approval of major alternatives to monitoring under §63.8(f) and as defined in §63.90.

(4) Approval of major alternatives to recordkeeping and reporting under §63.10(f) and as defined in §63.90.

§63.8266 What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act, in §63.2, and in this section as follows:

Aqueous liquid means a liquid mixture in which water is the predominant component.

Brine means an aqueous solution of alkali metal chloride, as sodium chloride salt solution or potassium chloride salt solution, that is used in the electrolyzer as a raw material.

By-product hydrogen stream means the hydrogen gas from each decomposer that passes through the hydrogen system and is burned as fuel, transferred to another process as raw material, or discharged directly to the atmosphere.

Caustic means an aqueous solution of alkali metal hydroxide, as sodium hydroxide or potassium hydroxide, that is produced in the decomposer.

Caustic basket means a fixture adjacent to the decomposer that contains a serrated funnel over which the caustic from the decomposer passes, breaking into droplets such that electric current is interrupted.

Caustic system means all vessels, piping, and equipment that convey caustic and remove mercury from the caustic stream. The caustic system begins at the decomposer and ends after the primary filters.

Cell room means a building or other structure in which one or more mercury cells are located.

Control device means a piece of equipment (such as condensers, coolers, chillers, heat exchangers, mist

eliminators, absorption units, and adsorption units) that removes mercury from gaseous streams.

Decomposer means the component of a mercury cell in which mercury amalgam and water react in bed of graphite packing (within a cylindrical vessel), producing caustic and hydrogen gas and returning mercury to its elemental form for re-use in the process.

Deviation means any instance in which an affected source subject to this subpart, or an owner or operator of such a source:

(1) Fails to meet any requirement or obligation established by this subpart including, but not limited to, any emission limitation (including any operating limit) or work practice standard;

(2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or

(3) Fails to meet any emission limitation (including any operating limit) or work practice standard in this subpart during startup, shutdown, or malfunction, regardless of whether or not such failure is permitted by this subpart.

Electrolyzer means the main component of the mercury cell that consists of an elongated, shallow steel trough that holds a layer of mercury as a flowing cathode. The electrolyzer is enclosed by side panels and a top that suspends metal anodes. In the electrolyzer, brine is fed between a flowing mercury cathode and metal anodes in the presence of electricity to produce chlorine gas and an alkali metal-mercury amalgam (mercury amalgam).

Emission limitation means any emission limit or operating limit.

End box means a component of a mercury cell for transferring materials between the electrolyzer and the decomposer. The inlet end box collects and combines raw materials at the inlet end of the cell, and the outlet end box separates and directs various materials either into the decomposer or out of the cell.

End-box ventilation system means all vessels, piping, and equipment that evacuate the head space of each mercury cell end box (and possibly other vessels and equipment) to the atmosphere. The end-box ventilation system begins at the end box (and other vessel or equipment which is being evacuated) and terminates at the end-box ventilation system vent. The end-box ventilation system includes all control devices.

End-box ventilation system vent means the discharge point of the end-box ventilation system to the atmosphere after all control devices.

Hydrogen leak means hydrogen gas (containing mercury vapor) that is escaping from the decomposer or hydrogen system.

Hydrogen system means all vessels, piping, and equipment that convey a by-product hydrogen stream. The hydrogen system begins at the decomposer and ends at the point where the by-product hydrogen stream is either burned as fuel, transferred to another process as raw material, or discharged directly to the atmosphere. The hydrogen system includes all control devices.

In liquid mercury service means containing or coming in contact with liquid mercury.

Liquid mercury accumulation means one or more liquid mercury droplets, or a pool of liquid mercury, present on the floor or other surface exposed to the atmosphere.

Liquid mercury leak means the liquid mercury that is dripping or otherwise escaping from process equipment.

Liquid mercury spill means a liquid mercury accumulation resulting from a liquid mercury that leaked from process equipment or that dripped during maintenance or handling.

Mercury cell means a device consisting of an electrolyzer and decomposer, with one or more end boxes, a mercury pump, and other components linking the electrolyzer and decomposer.

Mercury cell amalgam seal pot means a compartment through which mercury amalgam passes from an outlet end box to a decomposer.

Mercury cell chlor-alkali plant means all contiguous or adjoining property that is under common control, where mercury cells are used to manufacture product chlorine, product caustic, and by-product hydrogen and where mercury may be recovered from wastes.

Mercury cell chlor-alkali production facility means an affected source consisting of all cell rooms and ancillary operations used in the manufacture of product chlorine, product caustic, and by-product hydrogen at a mercury cell chlor-alkali plant.

Mercury concentration CMS, or mercury concentration continuous monitoring system, means a CMS, as defined in §63.2, that continuously measures the concentration of mercury.

Mercury-containing wastes means waste materials containing mercury, which are typically classified under Resource Conservation and Recovery Act (RCRA) solid waste

designations. K071 wastes are sludges from the brine system. K106 are wastewater treatment sludges. D009 wastes are non-specific mercury-containing wastes, further classified as either debris or nondebris (i.e., cell room sludges and carbon from decomposers).

Mercury pump means a component of a mercury cell for conveying elemental mercury re-created in the decomposer to the beginning of the mercury cell. A mercury pump is typically found either as an in-line mercury pump (near a mercury suction pot or mercury seal pot) or submerged mercury pump (within a mercury pump tank or mercury pump seal).

Mercury recovery facility means an affected source consisting of all processes and associated operations needed for mercury recovery from wastes at a mercury cell chlor-alkali plant.

Mercury thermal recovery unit means the retort(s) where mercury-containing wastes are heated to volatilize mercury and the mercury recovery/control system (control devices and other equipment) where the retort off-gas is cooled, causing mercury to condense and liquid mercury to be recovered.

Mercury thermal recovery unit vent means the discharge point of the mercury thermal recovery unit to

the atmosphere after all recovery/control devices. This term encompasses both oven type vents and non-oven type vents.

Mercury vacuum cleaner means a cleanup device used to draw a liquid mercury spill or accumulation (via suction pressure) into a closed compartment.

Non-oven type mercury thermal recovery unit vent means the discharge point to the atmosphere after all recovery/control devices of a mercury thermal recovery unit in which the retort is either a rotary kiln or single hearth retort.

Open-top container means any container that does not have a tight-fitting cover that keeps its contents from being exposed to the atmosphere.

Oven type mercury thermal recovery unit vent means the discharge point to the atmosphere after all recovery/control devices of a mercury thermal recovery unit in which each retort is a batch oven retort.

Responsible official means responsible official as defined in 40 CFR 70.2.

Retort means a furnace where mercury-containing wastes are heated to drive mercury into the gas phase. The types of retorts used as part of mercury thermal recovery units at mercury cell chlor-alkali plants

include batch oven retorts, rotary kilns, and single hearth retorts.

Spalling means fragmentation by chipping.

Sump means a large reservoir or pit for wastewaters (primarily washdown waters).

Trench means a narrow channel or depression built into the length of a cell room floor that leads washdown materials to a drain.

Vent hose means a connection for transporting gases from the mercury cell.

Washdown means the act of rinsing a floor or surface with a stream of aqueous liquid to cleanse it of a liquid mercury spill or accumulation, generally by driving it into a trench.

Work practice standard means any design, equipment, work practice, or operational standard, or combination thereof, that is promulgated pursuant to section 112(h) of the Clean Air Act.

Tables to Subpart IIIII of Part 63

**Table 1 to Subpart IIIII of Part 63--Work Practice Standards - Design, Operation,
and Maintenance Requirements**

As stated in §63.8192, you must meet the work practice standards in the following table:

For . . .	You must . . .
1. Cell rooms	<p>a. Construct each cell room interior using materials that are resistant to absorption of mercury, resistant to corrosion, facilitate the detection of liquid mercury spills or accumulations, and are easy to clean.</p> <p>b. Limit access around and beneath mercury cells in each cell room to prevent liquid mercury from being tracked into other areas.</p> <p>c. Provide adequate lighting in each cell room to facilitate the detection of liquid mercury spills or accumulations.</p> <p>d. Minimize the number of items stored in each cell room.</p>
2. Mercury cells and electrolyzers	<p>a. Operate and maintain each electrolyzer, decomposer, end box, and mercury pump to minimize leakage of mercury.</p> <p>b. Prior to opening an electrolyzer for maintenance, do the following: (1) complete work that can be done before opening the electrolyzer in order to minimize the time required to complete maintenance when the electrolyzer is open (e.g., removing bolts from a side panel while the electrolyzer is cooling); (2) fill the electrolyzer with an aqueous liquid; (3) allow the electrolyzer to cool before opening; and (4) schedule and staff maintenance of the electrolyzer to minimize the time the electrolyzer is open.</p>

- c. When the electrolyzer top is raised and before moving the top and anodes, thoroughly flush all visible mercury from the top and the anodes with an aqueous liquid.
- d. While an electrolyzer is open, keep the bottom covered with an aqueous liquid or maintain a continuous flow of aqueous liquid.
- e. During an electrolyzer side panel change, take measures to ensure an aqueous liquid covers or flows over the bottom.
- f. Each time an electrolyzer is opened, inspect and replace components, as appropriate.
- g. If you step into an electrolyzer bottom, either remove all visible mercury from your footwear or replace them immediately after stepping out of the electrolyzer.
- h. If an electrolyzer is disassembled for overhaul maintenance or for any other reason, chemically clean the bed plate or thoroughly flush it with an aqueous liquid.
- i. Before transporting each electrolyzer part to another work area, remove all visible mercury from the part or contain the part to prevent mercury from dripping during transport.
- j. After completing maintenance on an electrolyzer, check any mercury piping flanges that were opened for liquid mercury leaks.
- k. If a liquid mercury spill occurs during any maintenance activity on an electrolyzer, clean it up in accordance with the requirements in Table 3 to this subpart.

3. Vessels in liquid mercury service If you replace a vessel containing mercury that is intended to trap and collect mercury after **[DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER]**, replace it with a vessel that has a cone shaped bottom with a drain valve or other design that readily facilitates mercury collection.
4. Piping and process lines in liquid mercury service a. Use piping with smooth interiors to avoid liquid mercury buildups within the pipe.
b. To prevent mercury buildup after **[DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER]**, equip each new process line and piping system with adequate low point drains or mercury knock-out pots to facilitate mercury collection and recovery.
5. Cell room floors a. Maintain a coating on cell room floors that is resistant to absorption of mercury and that facilitates the detection of liquid mercury spills or accumulations.
b. Maintain cell room floors such that they are smooth and free of cracking and spalling.
c. Maintain troughs and trenches to prevent mercury accumulation in the corners.
d. Maintain a layer of aqueous liquid on liquid mercury contained in trenches or drains and replenish the aqueous layer at least once per day.
e. Keep the cell room floor clean and free of debris.
f. If you step into a liquid mercury spill or accumulation, either remove all visible mercury from your footwear or replace your footwear immediately.
6. End boxes a. Either equip each end box with a fixed cover that is leak tight, or route the end box head space to an end-box ventilation system.

b. For each end-box ventilation system: (1) maintain a flow of aqueous liquid over the liquid mercury in the end box and maintain the temperature of the aqueous liquid below its boiling point, (2) maintain a negative pressure in the end-box ventilation system, and (3) maintain the end-box ventilation system in good condition.

c. Maintain each end-box cover in good condition and keep the end box closed when the cell is in service and when liquid mercury is flowing down the cell, except when operation or maintenance activities require short-term access.

d. Keep all bolts and C-clamps used to hold the covers in place when the cell is in service and when liquid mercury is flowing down the cell.

e. Maintain each access port stopper in an end-box cover in good sealing condition and keep each end-box access port closed when the cell is in service and when liquid mercury is flowing down the cell.

7. Decomposers a. Maintain each decomposer cover in good condition and keep each decomposer closed and sealed, except when maintenance activities require the cover to be removed.

b. Maintain leak-tight connections between the decomposer and the corresponding cell components, hydrogen system piping, and caustic system piping, except when maintenance activities require access to these connections.

c. Keep each mercury cell amalgam seal pot closed and sealed, except when operation or maintenance activities require short-term access.

d. Prior to opening a decomposer, do the following: (1) fill the decomposer with an aqueous liquid or drain the decomposer liquid mercury into a container that meets requirements listed below for closed containers, (2) allow the decomposer to cool before opening, and (3) complete work that can be done before opening the decomposer.

e. Take precautions to avoid mercury spills when changing graphite grids or balls in horizontal decomposers or graphite packing in vertical decomposers. If a spill occurs, you must clean it up in accordance with the requirements in Table 3 to this subpart.

f. After each maintenance activity, use an appropriate technique (see Table 7 to this subpart) to check for hydrogen leaks.

g. Before transporting any internal part from the decomposer (such as the graphite basket) to another work area, remove all visible mercury from the part or contain the part to prevent mercury from dripping during transport.

h. Store carbon from decomposers in accordance with the requirements in Table 5 to this subpart until the carbon is treated or is disposed.

8. Submerged
mercury pumps

a. Provide a vapor outlet connection from each submerged pump to an end-box ventilation system. The connection must be maintained under negative pressure.

b. Keep each mercury pump tank closed, except when maintenance or operation activities require the cover to be removed.

c. Maintain a flow of aqueous liquid over the liquid mercury in each mercury pump tank and maintain the aqueous liquid at a temperature below its boiling point.

9. Open-top containers holding liquid mercury	Maintain a layer of aqueous liquid over liquid mercury in each open-top container. Replenish the aqueous layer at least once per day and collect the liquid mercury from the container in accordance with the requirements in Table 4 to this subpart.
10. Closed containers used to store liquid mercury	<ul style="list-style-type: none">a. Store liquid mercury in containers with tight fitting covers.b. Maintain the seals on the covers in good condition.c. Keep each container securely closed when mercury is not being added to, or removed from, the container.
11. Caustic systems	<ul style="list-style-type: none">a. Maintain the seal between each caustic basket cover and caustic basket by using gaskets and other appropriate material.b. Prevent solids and liquids collected from back-flushing each primary caustic filter to contact floors or run into open trenches.c. Collect solids and liquids from back-flushing each primary caustic filter and store these mercury-containing wastes in accordance with the requirements in Table 5 to this subpart.d. Keep each caustic basket closed and sealed, except when operation or maintenance activities require short term access.
12. Hydrogen systems	<ul style="list-style-type: none">a. Collect drips from each hydrogen seal pot and compressor seal in containers meeting the requirements in this table for open containers. These drips should not be allowed to run on the floor or in open trenches.b. Minimize purging of hydrogen from a decomposer into the cell room by either sweeping the decomposer with an inert gas or by routing the hydrogen to the hydrogen system.c. Maintain hydrogen piping gaskets in good condition.

d. After any maintenance activities, use an appropriate technique (see Table 7 to this subpart) to check all hydrogen piping flanges that were opened for hydrogen leaks.

Table 2 to Subpart IIIII of Part 63--Work Practice Standards - Required Inspections

As stated in §63.8192, you must meet the work practice standards in the following table:

You must inspect . . .	At least once each . . .	And if you find . . .	You must . . .
1. Each vent hose on each mercury cell	12 hours	a leaking vent hose	take action immediately to correct the leak.
2. Each open-top container holding liquid mercury	12 hours	liquid mercury that is not covered by an aqueous liquid	take action immediately to cover the liquid mercury with an aqueous liquid.
3. Each end box	12 hours	a. an end-box cover not securely in place	take action immediately to put the end-box cover securely in place.

		b. an end-box stopper not securely in place	take action immediately to put the end-box stopper securely in place.
		c. liquid mercury in an end box that is not covered by an aqueous liquid at a temperature below boiling	take action immediately to cover the liquid mercury with an aqueous liquid.
4. Each mercury amalgam seal pot	12 hours	a seal pot cover that is not securely in place	take action immediately to put the seal pot cover securely in place.
5. Each mercury seal pot	12 hours	a mercury seal pot stopper not securely in place	take action immediately to put the mercury seal pot stopper securely in place.
6. Cell room floors	month	cracks, spalling, or other deficiencies that could cause liquid mercury to become trapped	repair the crack, spalling, or other deficiency within 1 month from the time you identify the deficiency.

7. Pillars and beams	6 months	cracks, spalling, or other deficiencies that could cause liquid mercury to become trapped	repair the crack, spalling, or other deficiency within 1 month from the time you identify the deficiency.
8. Each caustic basket	12 hours	a caustic basket cover that is not securely in place	take action immediately to put the caustic basket cover securely in place.
9. All equipment and piping in the caustic system	24 hours	equipment that is leaking caustic	initiate repair of the leaking equipment within 72 hours from the time that you identify the caustic leak.
10. All floors and other surfaces where liquid mercury could accumulate in cell rooms and other production facilities and in mercury recovery facilities	12 hours	a liquid mercury spill or accumulation	take the required action specified in Table 3 to this subpart.

11. Each electrolyzer bottom, electrolyzer side panel, end box, mercury amalgam seal pot, decomposer, mercury pump, and hydrogen cooler, and all other vessels, piping, and equipment in liquid mercury service in the cell room	24 hours	equipment that is leaking liquid mercury	take the required action specified in Table 3 to this subpart.
12. Each decomposer and all hydrogen piping up to the hydrogen header	12 hours	equipment that is leaking hydrogen and/or mercury vapor	take the required action specified in Table 3 to this subpart.
13. All equipment in the hydrogen system from the start of the header to the last control device	3 months	equipment that is leaking hydrogen and/or mercury vapor	take the required action specified in Table 3 to this subpart.

Note: See Table 7 of this subpart for examples of techniques for conducting the inspections required in this table

Table 3 to Subpart IIIII of Part 63--Work Practice Standards - Required Actions for Liquid Mercury Spills and Accumulations and Hydrogen and Mercury Vapor Leaks

As stated in §63.8192, you must meet the work practice standards in the following table:

During a
required
inspection or
at any other
time, if you
find . . .

You must . . .

1. A liquid
mercury spill
or accumulation

a. Initiate clean up of the liquid mercury spill or accumulation as soon as possible, but no later than 1 hour from the time you detect it.

b. Clean up liquid mercury using: (1) a mercury vacuum cleaner, (2) by washing the mercury to the nearest trench or sump, or (3) by using an alternative method. If you use an alternative method to clean up liquid mercury, you must submit a description of the method to the Administrator in your Notification of Compliance Status report.

c. If you use a mercury vacuum cleaner: (1) the vacuum cleaner must be designed to prevent generation of airborne mercury, (2) you must cap the ends of hoses after each use, and (3) after vacuuming, you must wash down the area.

- d. Inspect all equipment in liquid mercury service in the surrounding area to identify the source of the liquid mercury within 1 hour from the time you detect the liquid mercury spill or accumulation.
- e. If you identify leaking equipment as the source of the spill or accumulation, contain the dripping mercury, stop the leak, and repair the leaking equipment as specified below.
- f. If you cannot identify the source of the liquid mercury spill or accumulation, re-inspect the area within 6 hours of the time you detected the liquid mercury spill or accumulation, or within 6 hours of the last inspection of the area.

2. Equipment that is leaking liquid mercury
- a. Contain the liquid mercury dripping from the leaking equipment by placing a container under the leak within 30 minutes from the time you identify the liquid mercury leak.
 - b. The container must meet the requirement for open-top containers in Table 1 to this subpart.
 - c. Make a first attempt at stopping the leak within 1 hour from the time you identify the liquid mercury leak.
 - d. Stop the leak and repair the leaking equipment within 4 hours from the time you identify the liquid mercury leak.
 - e. You can delay repair of equipment leaking liquid mercury if you either: (1) isolate the leaking equipment from the process so that it does not remain in mercury service; or (2) determine that you cannot repair the leaking equipment without taking the cell off line, provided that you contain the dripping mercury at all times as described above, and take the cell off line as soon as practicable, but no later than 48 hours from the time you identify the leaking equipment. You cannot place the cell back into service until the leaking equipment is repaired.
3. A decomposer or hydrogen system piping up to the hydrogen header that is leaking hydrogen and/or mercury vapor
- a. Make a first attempt at stopping the leak within 1 hour from the time you identify the hydrogen and/or mercury vapor leak.
 - b. Stop the leak and repair the leaking equipment within 4 hours from the time you identify the hydrogen and/or mercury vapor leak.
 - c. You can delay repair of a equipment leaking hydrogen and/or mercury vapor if you isolate the leaking equipment or take the cell off line until you repair the leaking equipment.

- | | |
|--|---|
| 4. Equipment in the hydrogen system, from the start of the hydrogen header to the last control device, that is leaking hydrogen and/or mercury vapor | a. Make a first attempt at stopping the leak within 4 hours from the time you identify the hydrogen and/or mercury vapor leak.

b. Stop the leak and repair the header within 24 hours from the time you identify the hydrogen and/or mercury vapor leak.

c. You can delay repair of equipment leaking hydrogen and/or mercury vapor if you isolate the leaking equipment. |
|--|---|
-

Table 4 to Subpart IIIII of Part 63--Work Practice Standards - Requirements for Mercury Liquid Collection

As stated in §63.8192, you must meet the work practice standards in the following table:

You must collect liquid mercury from . . .	When	Additional Requirements
--	------	-------------------------

1. Open-top containers	a. at least once each 72 hours.	i. If you spill liquid mercury during collection or transport, you must take the action specified in Table 3 to this subpart for liquid mercury spills and accumulations.	(1) From the time that you collect liquid mercury into a temporary container until the time that you store the liquid mercury, you must keep it covered by an aqueous liquid.	(A) Within 4 hours from the time you collect the liquid mercury, you must transfer it from each temporary container to a storage container that meets the specifications in Table 1 to this subpart.
2. Vessels, low point drains, mercury knock-out pots, and other closed mercury collection points	a. at least once each week.	See 1.a.i. above.	See 1.a.i.(1) above.	See 1.a.i.(A) above.
3. All other equipment	a. whenever maintenance activities require the opening of the equipment.	See 1.a.i. above.	See 1.a.i.(1) above.	See 1.a.i.(A) above.

Table 5 to Subpart IIIII of Part 63--Work Practice Standards - Requirements for Handling and Storage of Mercury-Containing Wastes

As stated in §63.8192, you must meet the work practice standards in the following table:

For . . .	You must . . .
1. Carbon media from decomposers and cell room sludges	a. Store wastes in closed containers, or b. Maintain a layer of aqueous liquid over wastes in open-top containers and replenish the aqueous layer at least once per week.
2. All other mercury-containing wastes	a. Wash or chemically decontaminate wastes to remove visible mercury, or b. Store wastes in closed containers.

Table 6 to Subpart IIIII of Part 63--Required Elements of Washdown Plans

As stated in §63.8192, your written washdown plan must address the elements contained in the following table:

For each of the following areas. . .	You must establish the following as part of your plan. . .
<ol style="list-style-type: none"> 1. Center aisles of cell rooms 2. Electrolyzers 3. End boxes and areas under end boxes 4. Decomposers and areas under decomposers 5. Caustic baskets and areas around caustic baskets 6. Hydrogen system piping 7. Basement floor of cell rooms 8. Tanks 9. Pillars and beams in cell rooms 10. Mercury cell repair areas 11. Maintenance shop areas 12. Work tables 13. Castings 14. Storage areas for mercury-containing wastes 	<p>A description of the manner of washdown of the area, and the washdown frequency for the area.</p>

Table 7 to Subpart IIIII of Part 63--Examples of Techniques for Equipment Problem Identification, Leak Detection and Mercury Vapor Measurements

As stated in Tables 1 and 2 of Subpart IIIII, examples of techniques for equipment problem identification, leak detection and mercury vapor measurements can be found in the following table:

To Detect . . .	You could use . . .	Principle of detection
1. Leaking vent hoses; liquid mercury that is not covered by an aqueous liquid in open-top containers or end boxes; end-box covers or stoppers, amalgam seal pot stoppers, or caustic basket covers not securely in place; cracks or spalling in cell room floors, pillars, or beams; caustic leaks; liquid mercury accumulations or spills; and equipment that is leaking liquid mercury	Visual inspections.	
2. Equipment that is leaking hydrogen and/or mercury vapor during inspections required by Table 2 to this subpart	a. Auditory and visual inspections.	

b. Portable mercury vapor analyzer - ultraviolet light absorption detector.

A sample of gas is drawn through a detection cell where ultraviolet light at 253.7 nanometers (nm) is directed perpendicularly through the sample toward a photodetector. Mercury absorbs the incident light in proportion to its concentration in the air stream.

c. Portable mercury vapor analyzer - gold film amalgamation detector.

A sample of gas is drawn through a detection cell containing a gold film detector. Mercury amalgamates with the gold film, changing the resistance of the detector in proportion to the mercury concentration in the air sample.

d. Portable short-wave ultraviolet light, fluorescent background - visual indication.

Ultraviolet light is directed toward a fluorescent background positioned behind a suspected source of mercury emissions. Mercury vapor absorbs the ultraviolet light, projecting a dark shadow image on the fluorescent background.

- e. Portable combustible gas meter.
3. Level of mercury vapor in the cell room and other areas
- a. Portable mercury vapor analyzer - ultraviolet light absorption detector.
- A sample of gas is drawn through a detection cell where ultraviolet light at 253.7 nanometers (nm) is directed perpendicularly through the sample toward a photodetector. Mercury absorbs the incident light in proportion to its concentration in the air stream.
- b. Portable mercury vapor analyzer - gold film amalgamation detector.
- A sample of gas is drawn through a detection cell containing a gold film detector. Mercury amalgamates with the gold film, changing the resistance of the detector in proportion to the mercury concentration in the air sample.
-

c. Permanganate
impingement.

A known volume of gas sample is absorbed in potassium permanganate solution. Mercury in the solution is determined using a cold vapor adsorption analyzer, and the concentration of mercury in the gas sample is calculated.

Table 8 to Subpart IIIII of Part 63--Required Records for Work Practice Standards

As stated in §63.8256(c), you must keep the records (related to the work practice standards) specified in the following table:

For each . . .	You must record the following information . . .
1. Inspection required by Table 2 to this subpart	Date and time the inspection was conducted.

2. Of the following situations found during an inspection required by Table 2 to this subpart: leaking vent hose; open-top container where liquid mercury is not covered by an aqueous liquid; end-box cover that is not securely in place; end-box stopper that is not securely in place; end box where liquid mercury is not covered by an aqueous liquid at a temperature below boiling; seal pot cover that is not securely in place; open or mercury seal pot stopper that is not securely in place; crack, spalling, or other deficiency in a cell room floor, pillar, or beam that could cause liquid mercury to become trapped; or caustic basket that is not securely in place.

3. A caustic leak during an inspection required by Table 2 to this subpart

- a. Description of the condition.
 - b. Location of the condition.
 - c. Date and time you identify the condition.
 - d. Description of the corrective action taken.
 - e. Date and time you successfully complete the corrective action.
-
- a. Location of the leak.
 - b. Date and time you identify the leak.
 - c. Date and time you successfully stop the leak and repair the leaking equipment.

4. Liquid mercury spill or accumulation identified during an inspection required by Table 2 to this subpart or at any other time

- a. Location of the liquid mercury spill or accumulation.
- b. Estimate of the weight of liquid mercury.
- c. Date and time you detect the liquid mercury spill or accumulation.
- d. Method you use to clean up the liquid mercury spill or accumulation.
- e. Date and time when you clean up the liquid mercury spill or accumulation.
- f. Source of the liquid mercury spill or accumulation.
- g. If the source of the liquid mercury spill or accumulation is not identified, the time when you reinspect the area.

5. Liquid mercury leak or hydrogen leak identified during an inspection required by Table 2 to this subpart or at any other time

- a. Location of the leak.
- b. Date and time you identify the leak.
- c. If the leak is a liquid mercury leak, the date and time that you successfully contain the dripping liquid mercury.
- d. Date and time you first attempt to stop the leak.
- e. Date and time you successfully stop the leak and repair the leaking equipment.
- f. If you take a cell off line or isolate the leaking equipment, the date and time you take the cell off line or isolate the leaking equipment, and the date and time you put the cell or isolated equipment back into service.

6. Carbon media from decomposers and cell room sludges

- a. A statement that these wastes are stored in closed containers, or
- b. Date and time you replenish the aqueous layer over these wastes stored in open-top containers.

7. All other mercury-containing wastes
- a. A description of how you remove visible mercury, or
 - b. A statement that these wastes are stored in closed containers.

Table 9 to Subpart IIIII of Part 63--Applicability of General Provisions to Subpart IIIII

As stated in §63.8262, you must comply with the applicable General Provisions requirements according to the following table:

Citation	Subject	Applies to Subpart IHHH	Explanation
§63.1	Applicability	Yes	
§63.2	Definitions	Yes	
§63.3	Units and Abbreviations	Yes	
§63.4	Prohibited Activities	Yes	
§63.5	Construction/ Reconstruction	Yes	
§63.6(a) - (g), (i), (j)	Compliance with Standards and Maintenance Requirements	Yes	
§63.6(h)	Compliance with Opacity and Visible Emission Standards	No	Subpart IHHH does not have opacity and visible emission standards.

§63.7	Performance Testing Requirements	Yes	Subpart IIIII specifies additional requirements related to site-specific test plans and the conduct of performance tests.
§63.8(a)(1), (a)(3); (b); (c)(1)-(4), (6)- (8); (d); (e); and (f)(1)-(5)	Monitoring Requirements	Yes	
§63.8(a)(2)	Continuous Monitoring System (CMS) Requirements	No	Subpart IIIII requires a site-specific monitoring plan in lieu of a promulgated performance specification for a mercury concentration CMS.
§63.8(a)(4)	Additional Monitoring Requirements for Control Devices in §63.11	No	Subpart IIIII does not require flares.

§63.8(c)(5)	COMS Minimum Procedures	No	Subpart IEEEE does not have opacity and visible emission standards.
§63.8(f)(6)	Alternative to Relative Accuracy Test	No	Subpart IEEEE does not require CEMS.
§63.8(g)	Data Reduction	No	Subpart IEEEE specifies mercury concentration CMS data reduction requirements.
§63.9(a)-(e), (g)-(j)	Notification Requirements	Yes	
§63.9(f)	Notification of VE/Opacity Test	No	Subpart IEEEE does not have opacity and visible emission standards.
§63.10(a); (b)(1); (b)(2)(i)-(xii), (xiv); (b)(3); (c); (d)(1)-(2), (4)-(5); (e); (f)	Recordkeeping/Reporting	Yes	
§63.10(b)(2) (xiii)	CMS Records for RATA Alternative	No	Subpart IEEEE does not require CEMS.

§63.10(d)(3)	Reporting Opacity or VE Observations	No	Subpart IEEEE does not have opacity and visible emission standards.
§63.11	Flares	No	Subpart IEEEE does not require flares.
§63.12	Delegation	Yes	
§63.13	Addresses	Yes	
§63.14	Incorporation by Reference	Yes	
§63.15	Availability of Information	Yes	
